United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Cass County, Illinois

How To Use This Soil Survey

General Soil Map

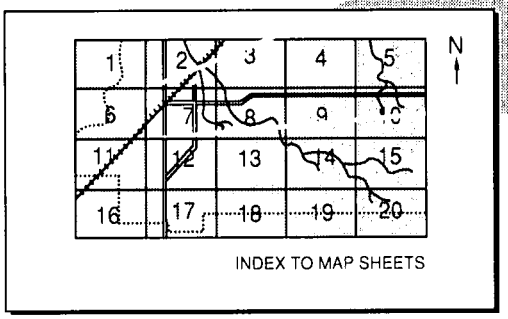
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

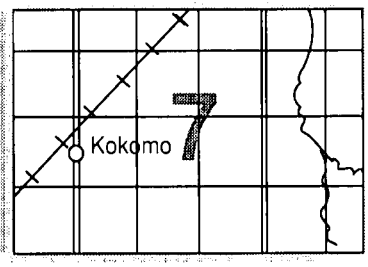
Detailed Soil Maps

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

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

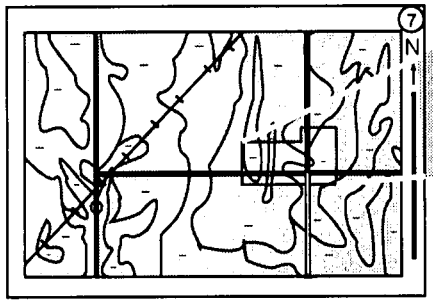


INDEX TO MAP SHEETS

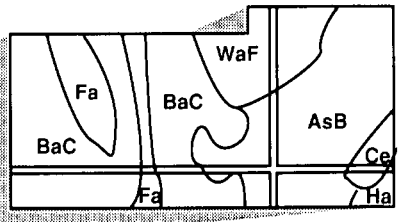


MAP SHEET

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



MAP SHEET



AREA OF INTEREST

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

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

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in February 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Cass County Soil and Water Conservation District. The cost was shared by the Cass County Board and the Illinois Department of Agriculture.

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

This survey updates a soil survey of Cass County published in 1947 *(7)*. It provides more recent information and larger maps, which show the soils in greater detail.

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 129.

All programs and services of the Soil Conservation Service are offered on a nondiscriminating basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Farming is the major enterprise in Cass County. The cultivated area is Arenzville silt loam, rarely flooded, and the pastured and wooded areas are Hamburg silt loam, 35 to 60 percent slopes.

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Issued September 1989

Index to Map Units

Summary of Tables

Foreword

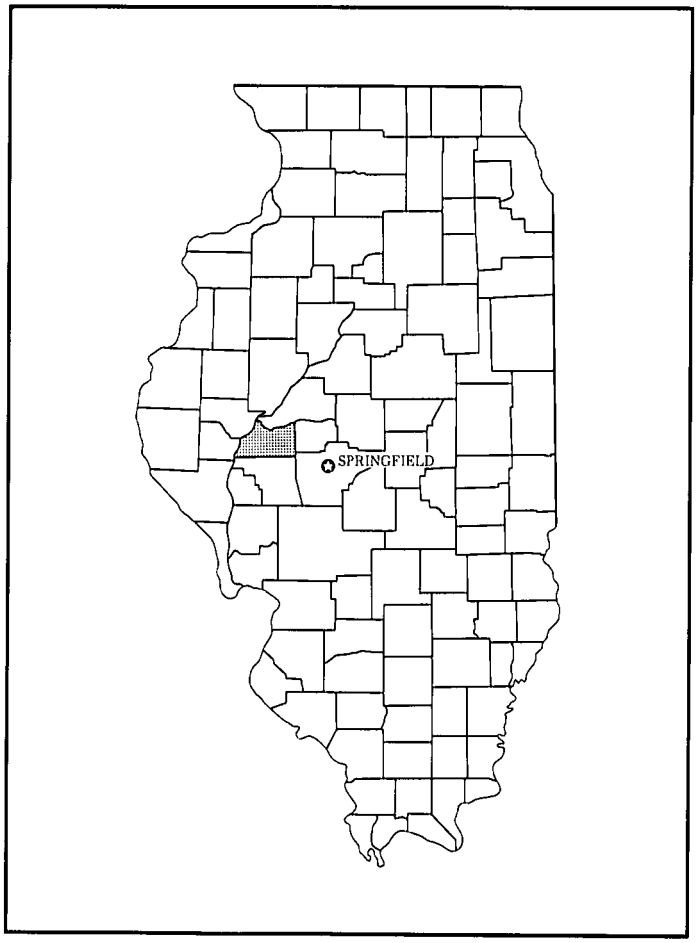
This soil survey contains information that can be used in land-planning programs in Cass County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of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

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

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

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

John E. Eckes
State Conservationist
Soil Conservation Service



Location of Cass County in Illinois.

Soil Survey of Cass County, Illinois

By Dale E. Calsyn, Soil Conservation Service; assisted by Kim P. Black and James K. Witt, Cass County

Fieldwork by Dale E. Calsyn, Soil Conservation Service, and Kim P. Black and James K. Witt, Cass County

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

CASS COUNTY is in the west-central part of Illinois. It has an area of 243,200 acres, or about 380 square miles. It is bordered on the north by the Sangamon River and Mason County, on the east by Menard and Sangamon Counties, on the south by Morgan County, and on the west by the Illinois River. According to the 1980 census, the population of the county was 15,804. Virginia is the county seat.

General Nature of the County

The following paragraphs provide general information about the history and development; the relief, physiography, and drainage; and the climate of Cass County.

History and Development

The first settlers came to Cass County in about 1819 and located in the Indian village of Kickapoo, later named Beardstown *(6)*. Cass County was established on August 7, 1837, from part of Morgan County. In May 1845, a three mile wide strip was added to the southern edge of the county. The county seat was first Virginia, then Beardstown, and finally Virginia.

U.S. Highway 67 and State Routes 78, 100, and 123 cross Cass County from north to south, and State Route 125 crosses it from east to west. Railroads furnish freight service. Facilities for loading commodities onto barges are available at Beardstown.

Farming continues to be the major enterprise in the county. In 1982, the number of farms was 550 and the acreage of farmland was about 88 percent of the total land area *(11)*. Corn was grown on 80,858 acres and soybeans on 69,820 acres. About 9,336 acres was used for wheat and 11,446 acres for pasture. Specialty crops, such as melons and pumpkins, were also grown. In addition, about 82,155 hogs, 16,092 cattle, 1,585 hens, and 432 sheep were in the county.

Several light industries are in the county. These include a slaughter and meat processing plant and manufacturers of air conditioner components, metal tanks, and television satellite dishes.

Relief, Physiography, and Drainage

Elevation ranges from 670 feet above sea level at a point about 3 miles southwest of Chandlerville to 425 feet above sea level at a point between Meredosia Lake and the Illinois River.

The county is on the Springfield Plain of the Central Lowland Province *(12)*. The soils on the uplands formed mainly in loess, and the soils on terraces formed mainly in sandy and loamy material. Major bottom land areas are along the Illinois and Sangamon Rivers.

Cass County has 10 major watersheds. The northern and eastern parts of the county are drained by the Cox, Jobs, Middle, and Panther Creeks, which flow into the Sangamon River. Watersheds of the Clear, Indian, Lost,

and Prairie Creeks drain the southern and western parts of the county. These creeks flow into the Illinois River.

Climate

Peter Vinzani, weather observer, State Water Survey Division, Illinois Institute of Natural Resources, helped prepare this section.

Cass County is cold in the winter and hot in the summer with occasional cool spells. Precipitation, mainly snow in the winter and rain in the rest of the year, generally is adequate for corn, soybeans, and small grains. Heavy rains sometimes fall in the warmer months.

Tornadoes, severe thunderstorms, and hailstorms occur occasionally. They are of local extent and of short duration and cause damage in variable patterns.

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

In winter the average temperature is 25.4 degrees F, and the average daily minimum temperature is 16.4 degrees. The lowest temperature on record, which occurred at Jacksonville on February 26, 1963, is -17 degrees. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87.3 degrees. The highest recorded temperature, which occurred at Jacksonville on July 14, 1954, is 114 degrees.

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

The total annual precipitation is 37.11 inches. Of this, 23.78 inches, or 65 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 4.53 inches.

The average seasonal snowfall is 20.1 inches. The greatest snow depth at any one time during the period of record was 20 inches.

The average relative humidity in midafternoon is about 64 percent. Humidity is higher at night, and the average at dawn is about 82 percent. The sun shines 71 percent of the time possible in summer and 47 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 13.9 miles per hour, in March.

How This Survey Was Made

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

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

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil

characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were 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 were 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 state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

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

Map Unit Composition

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

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

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

General Soil Map Units

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

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

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

The names of the soils identified on the general soil map of this county do not fully agree with those of the soils identified on the general soil map in the published soil surveys of the adjacent Morgan and Sangamon Counties. Differences result from variations in the extent of the major soils in the map unit. They do not necessarily affect broad land use planning because the soils having different names are similar in terms of use and behavior.

The map units in this county have been grouped for broad interpretive purposes. The 5 groups and 9 map units in Cass County are described in this section.

Soil Descriptions

Gently Sloping to Very Steep, Moderately Well Drained to Somewhat Excessively Drained Soils; on Uplands

The soils in this group formed in loess. In the less sloping areas, these soils are used primarily for cultivated crops. They are used as pastureland or woodland in the more sloping areas. The hazard of water erosion is the major concern in management.

1. Sylvan-Rozetta-Bold Association

Nearly level to steep, well drained and moderately well drained, silty soils that formed in loess

In this map unit, the landscape is mainly broad to narrow ridgetops and steep side slopes. Slopes generally range from 0 to 30 percent.

This map unit makes up about 22 percent of the county. It is about 36 percent Sylvan and similar soils, 32 percent Rozetta and similar soils, 18 percent Bold and similar soils, and 14 percent soils of minor extent (fig. 1).

The Sylvan soils are sloping to steep and are well drained. These soils are on convex side slopes. Typically, the surface layer is dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer to a depth of 10 inches is dark brown, friable silt loam. The upper part is dark brown, and the lower part is dark brown and dark yellowish brown. The subsoil extends to a depth of about 27 inches. The upper part is dark yellowish brown, firm silty clay loam; the middle part is yellowish brown, firm silty clay loam; and the lower part is yellowish brown, friable silt loam. The substratum to a depth of 60 inches or more is mottled, friable, calcareous silt loam. The upper part is yellowish brown, and the lower part is light brownish gray.

The Rozetta soils are nearly level and gently sloping and are moderately well drained. These soils are on broad to narrow ridgetops. Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer to a depth of about 15 inches is dark brown, friable silt loam. The subsoil extends to a depth of about 50 inches. The upper part is dark yellowish brown, firm silty clay loam; the middle part is yellowish brown, firm silty clay loam; and the lower part is yellowish brown, mottled, friable silt loam. The substratum to a depth of 60 inches or more is mottled brown, light brownish gray, and strong brown, friable silt loam.

The Bold soils are strongly sloping to steep, well drained, and calcareous. These soils are on convex

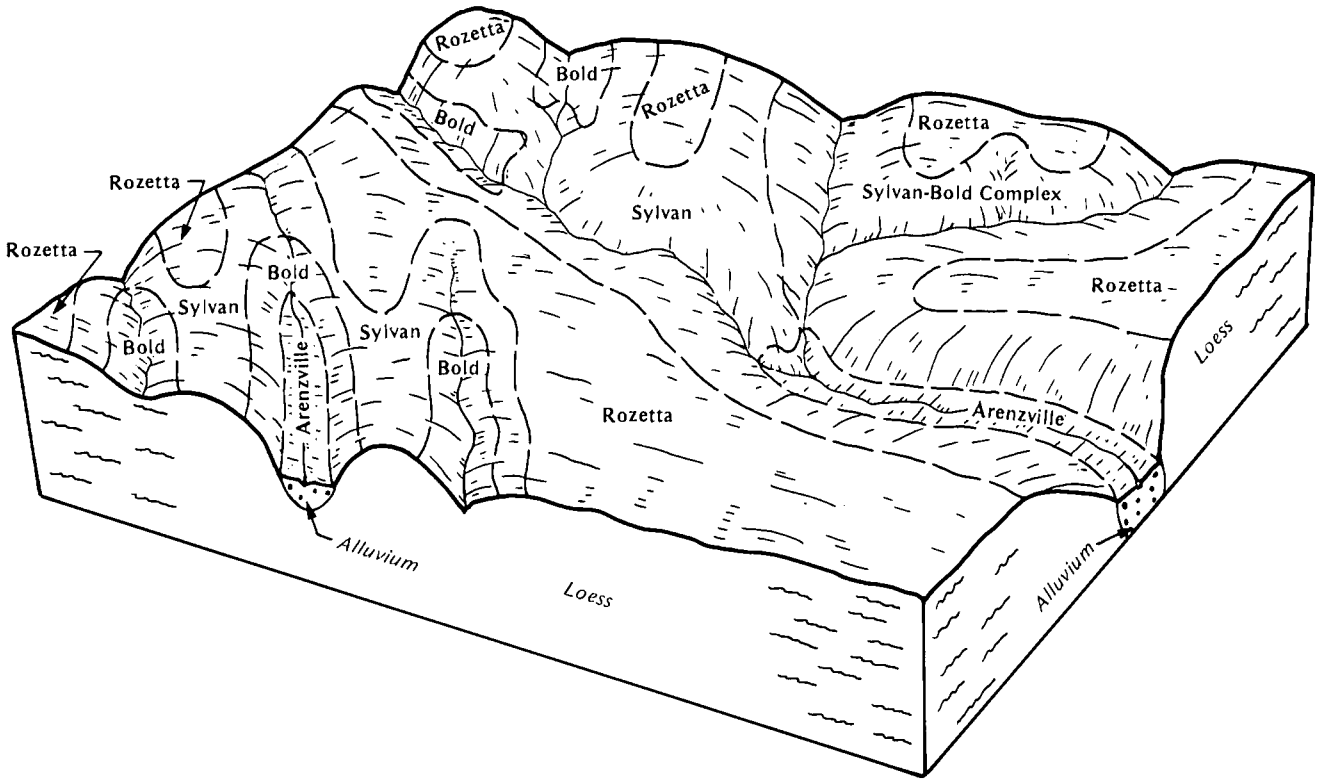


Figure 1.—Typical pattern of soils and parent material in the Sylvan-Rozetta-Bold general soil map unit.

side slopes. Typically, the surface layer is yellowish brown, friable silt loam. Water erosion has reduced the surface layer to a thickness of about 8 inches. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

Of minor extent in this map unit are the Arenzville, Ipava, Radford, and Tama soils. The Arenzville and Radford soils are on flood plains below the major soils. The Arenzville soils are moderately well drained, and the Radford soils are somewhat poorly drained. Ipava and Tama soils are in less sloping areas that are farther from the drainageways. These soils have a thick, dark colored surface layer.

In gently sloping and moderately sloping areas, the Sylvan, Rozetta, and Bold soils are used for cultivated crops. In more sloping areas, they are used as pastureland or woodland.

Sylvan and Boyd soils are poorly suited to cultivated crops and moderately suited to pasture. The main needs in managing cropland are to control water erosion and improve tilth and fertility. Rozetta soils are well suited to cultivated crops and to pasture. The soils of this map unit are moderately well suited to woodland.

These soils generally are moderately suited to use as sites for dwellings and septic tank absorption fields. In some areas, they are not suited because of the steepness of slope. The main limitations are the seasonal high water table, permeability, shrink-swell potential, and steepness of slope.

2. Hamburg-Fayette-Seaton Association

Gently sloping to very steep, somewhat excessively drained and well drained, silty soils that formed in loess

In this map unit, the landscape is rolling ridges and steep side slopes. Slopes generally range from 2 to 60 percent.

This map unit makes up about 8 percent of the county. It is about 46 percent Hamburg and similar soils, 27 percent Fayette and similar soils, 18 percent Seaton and similar soils, and 9 percent soils of minor extent (fig. 2).

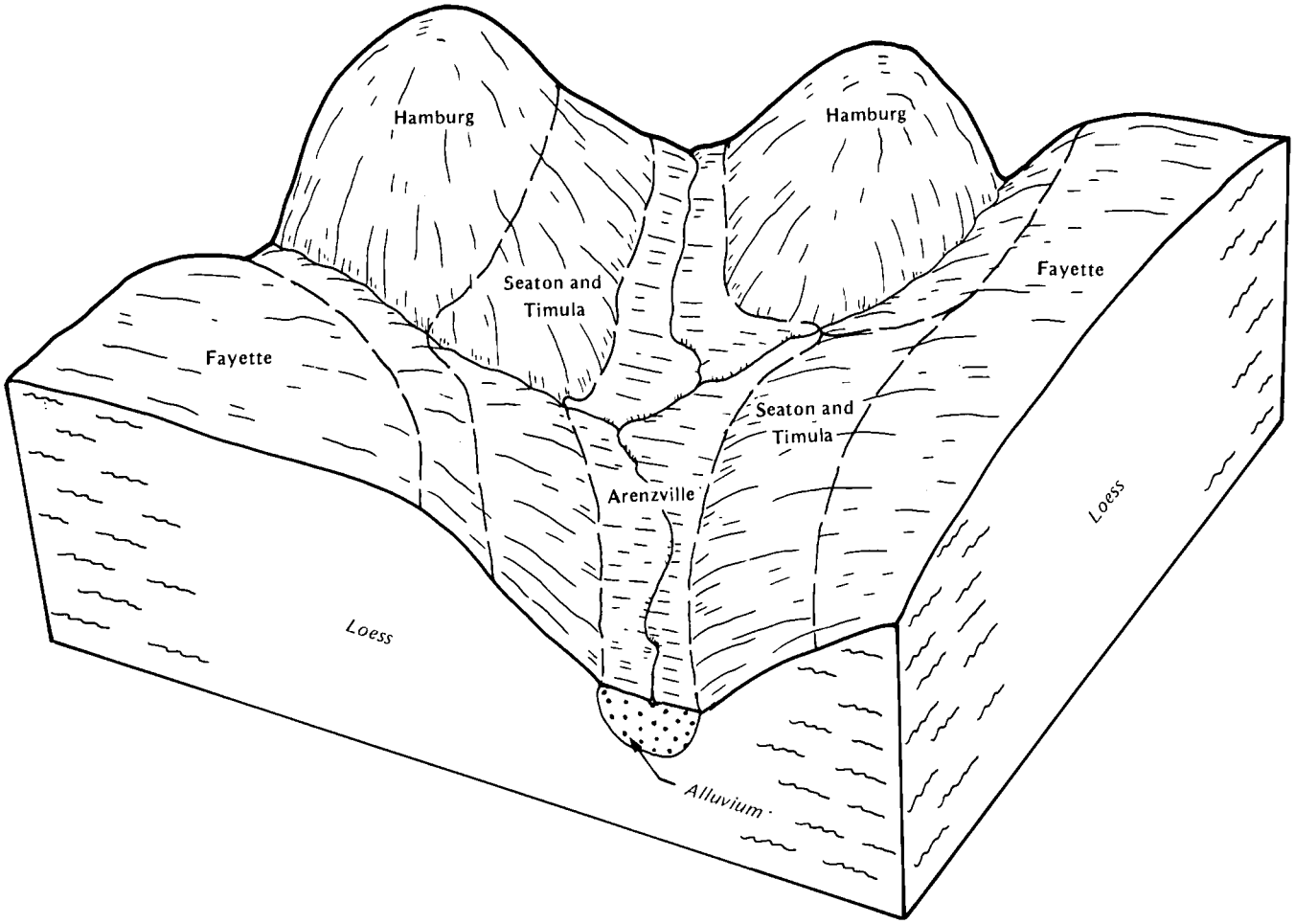


Figure 2.—Typical pattern of soils and parent material in the Hamburg-Fayette-Seaton general soil map unit.

The Hamburg soils are steep and very steep, somewhat excessively drained, and calcareous. These soils are on rounded mounds, narrow ridges, and side slopes. Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The underlying material to a depth of 60 inches or more is friable. The upper part is brown silt loam, the middle part is yellowish brown silt, and the lower part is light yellowish brown silt.

The Fayette soils are gently sloping to steep and are well drained. These soils are on ridgetops and side slopes. Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsurface layer to a depth of about 12 inches is dark yellowish brown, friable silt loam. The subsoil extends to a depth of at least 60 inches. It is dark yellowish brown, friable silt loam; dark yellowish brown, firm silty clay loam; yellowish brown, firm silty clay loam; and yellowish brown, firm silt loam.

The Seaton soils are steep and very steep and are well drained. These soils are on convex side slopes. Typically, the surface layer is mixed very dark grayish brown and dark grayish brown, friable silt loam about 3 inches thick. The subsurface layer to a depth of about 6 inches is dark brown, friable silt loam. The subsoil to a depth of 60 inches or more is dark yellowish brown silt loam. The upper part is friable, and the lower part is firm.

Of minor extent in this map unit are the Arenzville, Keomah, Plainfield, Radford, and Timula soils. Arenzville and Radford soils are on flood plains. Arenzville soils are moderately well drained, and

Radford soils are somewhat poorly drained. Keomah soils are in less sloping areas at a higher elevation than the major soils and are somewhat poorly drained. Plainfield soils are on convex side slopes and are sandy and excessively drained. Raddle soils are on toe slopes at a lower elevation than the major soils and are well drained. Timula soils are on side slopes at a higher elevation than the Seaton soils.

The Hamburg, Fayette, and Seaton soils are used mainly as pastureland or woodland. In some areas they are used for cultivated crops.

These soils generally are not suited to cultivated crops; however, the gently sloping areas of the Fayette soils are well suited. The main need in managing cropland is to control water erosion. The Hamburg and Seaton soils are moderately suited to pasture, and the Fayette soils generally are well suited. The Fayette and Seaton soils are moderately well suited to woodland, but the Hamburg soils are very poorly suited.

The soils in this map unit generally are not suited to use as sites for dwellings and septic tank absorption fields. In gently sloping to strongly sloping areas, the Fayette soils are moderately suited. The main limitations are the permeability, shrink-swell potential, and steepness of slope.

3. Tama-Bold-Tallula Association

Gently sloping to steep, well drained, silty soils that formed in loess

In this map unit, the landscape is broad to narrow, gently sloping ridges and sloping to steep side slopes. Slopes generally range from 2 to 30 percent.

This map unit makes up about 8 percent of the county. It is about 40 percent Tama and similar soils, 18 percent Bold soils, 16 percent Tallula and similar soils, and 26 percent soils of minor extent.

The Tama soils are on gently sloping ridges and sloping side slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown, friable silt loam. The subsoil to a depth of 60 inches or more is friable. The upper part is dark yellowish brown silty clay loam, and the lower part is dark yellowish brown and yellowish brown silty clay loam and silt loam.

The Bold soils are calcareous and are on strongly sloping to steep side slopes. Typically, the surface layer is yellowish brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 8 inches. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

The Tallula soils are on strongly sloping to steep side slopes at a higher elevation than the Bold soils. Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil to a depth of about 26 inches is friable silt loam. The upper part is brown, and the lower part is yellowish brown. The substratum to a depth of 60 inches or more is mottled, friable, and calcareous. The upper part is pale brown silt loam, and the lower part is light brownish gray silt.

Of minor extent in this map unit are the Hickory, Ipava, Radford, and Sylvan soils. Hickory and Sylvan soils have a light colored surface layer and are in positions similar to those of the major soils. Ipava soils are on broad ridges at a higher elevation and are somewhat poorly drained. Radford soils are on flood plains and are somewhat poorly drained.

The Tama, Bold, and Tallula soils are used mainly for cultivated crops. In some areas, they are used for pasture.

The Tama soils generally are well suited to the crops commonly grown in the area. The Bold soils in strongly sloping areas are poorly suited to cultivated crops. In steep areas, the Bold and Tallula soils are not suited to this use. The main need in managing cropland is to control water erosion. The Tama and Tallula soils are well suited to pasture, and the Bold soils are moderately suited.

The soils in this map unit generally are moderately suited to use as sites for dwellings and septic tank absorption fields. In steep areas, they are not suited. The main limitations are the permeability, shrink-swell potential, and steepness of slope.

Nearly Level to Sloping, Poorly Drained to Well Drained Soils; on Uplands

The soils in this group formed in loess. These soils are used primarily for cultivated crops. In some areas of these soils, water erosion is a hazard and the seasonal high water table is a limitation.

4. Ipava-Tama Association

Nearly level to gently sloping, somewhat poorly drained to well drained, silty soils that formed in loess

In this map unit, the landscape is nearly level, broad flats, ridges, and gently sloping and sloping side slopes. Slopes range from 0 to 10 percent.

This map unit makes up 13 percent of the county. It is about 50 percent Ipava soils, 26 percent Tama and

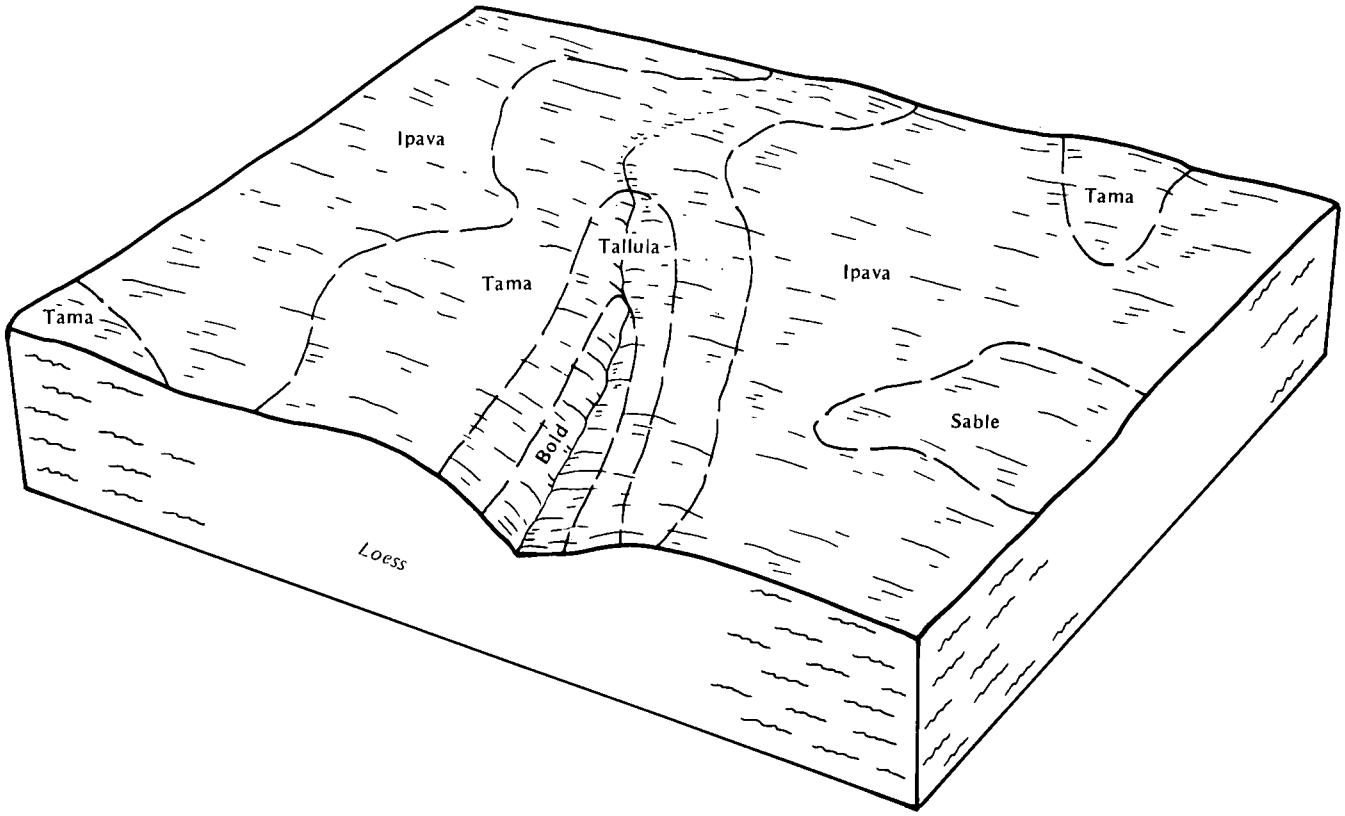


Figure 3.—Typical pattern of soils and parent material in the Ipava-Tama general soil map unit.

similar soils, and 24 percent soils of minor extent (fig. 3).

The Ipava soils are on nearly level, broad flats and on gently sloping ridges and side slopes. These soils are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer to a depth of about 21 inches is very dark gray, firm silty clay loam. The subsoil to a depth of about 52 inches is mottled and firm. The upper part is multicolored silty clay loam, and the lower part is light brownish gray and light yellowish brown silt loam. The substratum to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam.

The Tama soils are on nearly level to sloping ridges, slight rises, and side slopes. These soils are moderately well drained and well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown, friable silt loam. The subsoil to a depth of 60 inches or more is friable. The upper part is dark yellowish brown silty clay loam, and the lower part is dark yellowish brown and yellowish brown silt loam.

Of minor extent in this map unit are the Bold, Sable, Sylvan, and Tallula soils. Sable soils are in lower and flatter areas than the major soils and are poorly drained. Bold, Sylvan, and Tallula soils are on more sloping side slopes at a lower elevation than the major soils. Bold soils are calcareous. Sylvan soils have a light color surface layer, and Tallula soils have less clay.

The Ipava and Tama soils are used mainly for cultivated crops and are well suited to the crops commonly grown in the area. The main needs in managing cropland are to control water erosion and to maintain tilth and fertility.

The Ipava soils are poorly suited to use as sites for dwellings and septic tank absorption fields, and the Tama soils are moderately suited. The main limitations are the permeability, seasonal high water table, and shrink-swell potential.

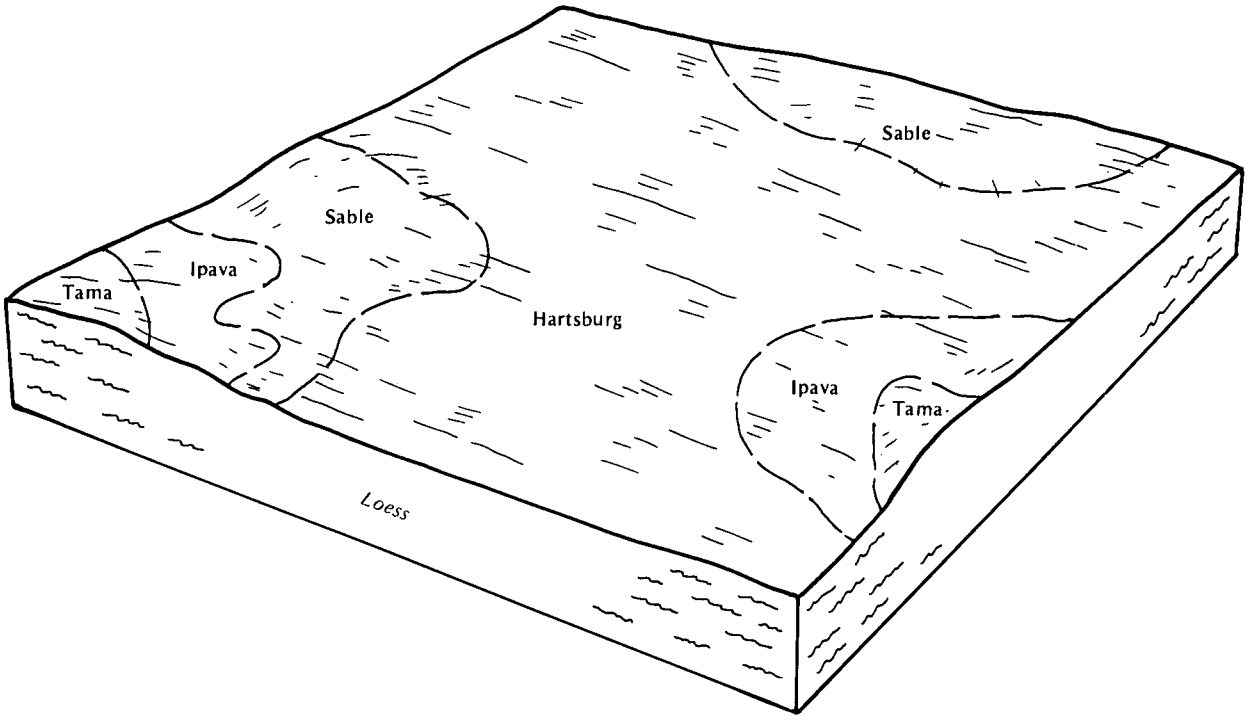


Figure 4.—Typical pattern of soils and parent material in the Hartsburg-Sable-Ipava general soil map unit.

5. Hartsburg-Sable-Ipava Association

Nearly level, poorly drained and somewhat poorly drained, silty soils that formed in loess

In this map unit, the landscape is mainly broad flats with some slight rises. Slopes generally range from 0 to 2 percent.

This map unit makes up about 5 percent of the county. It is about 63 percent Hartsburg soils, 20 percent Sable soils, 15 percent Ipava soils, and 2 percent soils of minor extent (fig. 4).

The Hartsburg soils are poorly drained. These soils are on broad flats generally on the lowest part of the landscape. Typically, the surface layer is black, friable silty clay loam about 6 inches thick. The subsurface layer to a depth of about 13 inches is black, friable silty clay loam. The subsoil to a depth of about 40 inches is mottled and friable. It is very dark gray silty clay loam; dark grayish brown, calcareous silty clay loam; dark grayish brown, olive brown, and strong brown, calcareous silty clay loam; grayish brown, calcareous silty clay loam; and grayish brown, calcareous silt loam. The substratum to a depth of 60 inches or more is grayish brown, mottled, friable, calcareous silt loam.

The Sable soils are poorly drained. These soils are on broad flats. Typically, the surface layer is black, firm silty clay loam about 6 inches thick. The subsurface layer to a depth of about 19 inches is black, firm silty clay loam. It is mottled in the lower part. The subsoil extends to a depth of about 50 inches and is mottled. The upper part is multicolored, firm silty clay loam; and the lower part is light brownish gray, friable silt loam. The substratum to a depth of 60 inches or more is mottled light brownish gray and light olive brown, friable silt loam.

The Ipava soils are somewhat poorly drained. These soils are on flats and slight rises at a higher elevation than the other major soils. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer to a depth of about 21 inches is very dark gray, firm silty clay loam. The subsoil extends to a depth of about 52 inches and is mottled and firm. The upper part is multicolored silty clay loam, and the lower part is light brownish gray and light yellowish brown silt loam. The substratum to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam.

Of minor extent in this map unit are the Tama soils.

These soils are on ridges at a higher elevation than the major soils and are moderately well drained and well drained.

The Hartsburg, Sable, and Ipava soils are used for cultivated crops and are well suited to the crops commonly grown in the area. The seasonal high water table is a limitation, and ponding is a hazard. The main needs in managing cropland are to maintain or improve the drainage system and tilth.

These soils are poorly suited to use as sites for dwellings and septic tank absorption fields mainly because of the ponding hazard and the seasonal high water table.

Nearly Level to Sloping, Well Drained and Somewhat Poorly Drained Soils; on Stream Terraces, Alluvial Fans, and Foot Slopes

The soils in this group formed in alluvium and colluvium. They are used primarily for cultivated crops. Water erosion is a hazard in some areas of these soils.

6. Worthen-Littleton-Raddle Association

Nearly level to sloping, well drained and somewhat poorly drained, silty soils that formed in alluvium and colluvium

In this map unit, the landscape is nearly level, broad flats and gently sloping to sloping foot slopes and alluvial fans. Slopes generally are long and concave. They range from 0 to 10 percent.

This map unit makes up about 8 percent of the county. It is about 45 percent Worthen soils, 25 percent Littleton and similar soils, 11 percent Raddle soils, and 19 percent soils of minor extent.

The Worthen soils are well drained. These soils are on nearly level, broad flats. Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsurface layer to a depth of about 31 inches is friable silt loam. The upper part is very dark grayish brown, and the lower part is dark brown. The subsoil to a depth of about 58 inches is friable silt loam. The upper part is dark brown, the middle part is dark yellowish brown, and the lower part is yellowish brown. The substratum to a depth of 60 inches or more is yellowish brown, friable, calcareous silt loam.

The Littleton soils are somewhat poorly drained. These soils are on nearly level, broad flats. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer to a depth of about 36 inches is friable silt loam. The upper part is black, and the lower part is very dark grayish brown and is mottled. The subsoil to a depth of 60 inches or more is mottled dark grayish brown and dark brown, friable silt loam.

The Raddle soils are gently sloping and sloping and are well drained. These soils are on convex side slopes of stream terraces and on concave foot slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer to a depth of about 16 inches is dark brown, friable silt loam. The subsoil to a depth of 60 inches or more is friable silt loam. The upper part is dark brown, the middle part is dark yellowish brown, and the lower part is yellowish brown and dark yellowish brown.

Of minor extent in this map unit are the Arenzville, Dickinson, Sparta, and Thorp soils. Arenzville soils are on flood plains at a lower elevation than the major soils and are moderately well drained. Dickinson and Sparta soils are on convex ridges at a higher elevation than the major soils. Dickinson soils are loamy, and Sparta soils are sandy. Thorp soils are in shallow depressions and are poorly drained.

The Worthen, Littleton, and Raddle soils are used for cultivated crops and are well suited to the crops commonly grown in the area. The main concern in managing cropland is maintaining tilth and fertility. Also, measures that control water erosion are needed in areas of the Raddle soils.

The Worthen and Raddle soils are well suited to use as sites for dwellings and septic tank absorption fields. Littleton soils are not suited to these uses because of the hazard of flooding and the seasonal high water table.

Gently Sloping to Steep, Excessively Drained to Well Drained Soils; on Uplands and Terraces

The soils in this group formed in wind- and water-deposited sandy and loamy material. The soils in less sloping areas are used primarily for cultivated crops, and those in the more sloping areas are used as pastureland or woodland. Soil blowing is a hazard, and low available water capacity is the main limitation.

7. Bloomfield-Plainfield-Alvin Association

Gently sloping to steep, excessively drained to well drained, sandy and loamy soils that formed in wind-deposited sandy and loamy material

In this map unit, the landscape is ridges, side slopes, and dunes. Slopes range from 1 to 30 percent.

This map unit makes up 3 percent of the county. It is about 44 percent Bloomfield soils, 33 percent Plainfield

soils, 14 percent Alvin soils, and 9 percent soils of minor extent.

The Bloomfield soils are sandy and somewhat excessively drained. These soils are on dune-like topography that has gently sloping to strongly sloping, convex slopes. Typically, the surface layer is dark brown, very friable fine sand about 9 inches thick. The subsurface layer to a depth of about 36 inches is yellowish brown, loose loamy fine sand. Between depths of 36 and 60 inches are alternate bands of yellowish brown and dark yellowish brown, very friable loamy fine sand and dark brown, friable fine sandy loam.

The Plainfield soils are sandy and somewhat excessively drained. These soils are on dune-like topography that has gently sloping to steep, convex slopes. Typically, the surface layer is dark brown, very friable sand about 8 inches thick. The subsoil is very friable sand to a depth of about 42 inches. The upper part is dark yellowish brown, and the lower part is dark yellowish brown and yellowish brown. The substratum to a depth of 60 inches or more is yellowish brown, loose sand.

The Alvin soils are loamy and well drained. These soils are on gently sloping ridges and sloping and strongly sloping side slopes. Typically, the surface layer is dark brown, friable fine sandy loam about 11 inches thick. The subsoil extends to a depth of about 53 inches. It is dark yellowish brown, friable loam; dark yellowish brown, friable fine sandy loam; dark yellowish brown and yellowish brown, friable fine sandy loam; and yellowish brown, very friable very fine sandy loam. The substratum to a depth of 60 inches or more is yellowish brown, very friable very fine sandy loam.

Of minor extent in this map unit are the Hamburg and Orio soils. Hamburg soils are on cone-shaped hills at a higher elevation than the major soils and are somewhat excessively drained, calcareous, and silty. Orio soils are in shallow depressions and are poorly drained.

In the less sloping areas, the Bloomfield, Plainfield, and Alvin soils are used mainly for cultivated crops. In the more sloping areas, they are used as woodland or pastureland.

Because of the soil blowing hazard and the low available water capacity, Bloomfield soils are poorly suited to the crops commonly grown in the area, and Plainfield soils are not suited. Alvin soils, however, are moderately suited. The main concern in managing cropland areas of the Alvin soils is water erosion. The soils in this map unit are moderately suited to use as pastureland. The Bloomfield and Plainfield soils are moderately suited to use as woodland, and the Alvin soils are moderately well suited.

In gently sloping areas, the soils in this map unit are well suited to use as sites for dwellings. They are moderately suited in strongly sloping areas and are not suited in steep areas. The Bloomfield and Plainfield soils are poorly suited to use as sites for septic tank absorption fields because of the hazard of ground water contamination. Alvin soils, however, are well suited to this use.

8. Plainfield-Sparta Association

Gently sloping to strongly sloping, excessively drained, sandy soils that formed in wind- and water-deposited sands

In this map unit, the landscape is mainly ridges and dunes. Slopes range from 1 to 15 percent.

This map unit makes up 12 percent of the county. It is about 52 percent Plainfield and similar soils, 13 percent Sparta soils, and 35 percent soils of minor extent (fig. 5).

The Plainfield soils are gently sloping to strongly sloping. These soils are on convex ridges and dunes. Typically, the surface layer is dark brown, very friable sand about 8 inches thick. The subsoil to a depth of about 32 inches is very friable sand. The upper part is dark yellowish brown, and the lower part is dark yellowish brown and yellowish brown. The substratum to a depth of 60 inches or more is yellowish brown, loose sand.

The Sparta soils are gently sloping. These soils are on convex, dune-like ridges. Typically, the surface layer is very dark grayish brown, very friable loamy sand about 10 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown, very friable loamy sand. The subsoil to a depth of about 39 inches is very friable. The upper part is brown loamy sand, the middle part is dark yellowish brown loamy sand, and the lower part is yellowish brown sand. The substratum to a depth of 60 inches or more is yellowish brown, loose sand.

Of minor extent in this map unit are the Beardstown, Dickinson, Gilford, Hoopeston, Orio, and Watseka soils. Beardstown, Hoopeston, Watseka, and Gilford soils are in flat areas at a lower elevation than the major soils. Beardstown, Hoopeston, and Watseka soils are somewhat poorly drained, and Gilford soils are very poorly drained. Dickinson soils are on ridges and flats similar to those of the major soils and are well drained. Orio soils are in slightly depressed areas and are poorly drained.

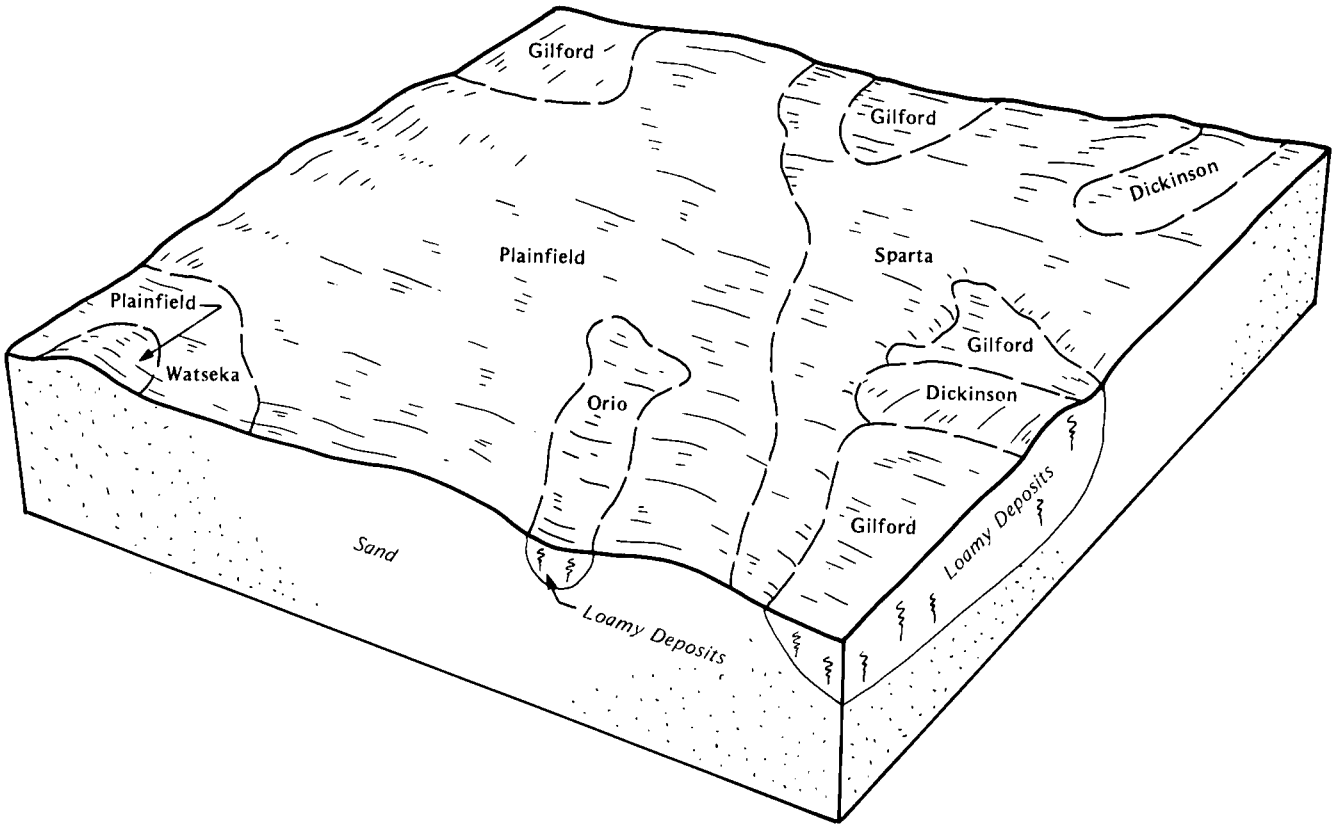


Figure 5.—Typical pattern of soils and parent material in the Plainfield-Sparta general soil map unit.

The Plainfield and Sparta soils are used mainly for cultivated crops. In some areas, they are used as woodland.

Because of the soil blowing hazard and the low available water capacity, Plainfield soils are not suited to the crops commonly grown in the area, and Sparta soils are only poorly suited. The soils in this map unit are moderately suited to woodland.

These soils are generally well suited to use as sites for dwellings; however, in strongly sloping areas, they are only moderately suited to this use. Because of the hazard of ground water contamination, these soils are poorly suited to use as sites for septic tank absorption fields.

Nearly Level, Poorly Drained and Somewhat Poorly Drained Soils; on Flood Plains

The soils in this group formed in loess or alluvium. They are used primarily for cultivated crops. In undrained areas, these soils are used as woodland. Wetness is the main limitation. Flooding is a hazard in some areas of these soils.

9. Beaucoup-Ambraw-Dockery Association

Nearly level, poorly drained and somewhat poorly drained, silty and loamy soils that formed in alluvium

In this map unit, the landscape typically is flats and low lying areas. Slopes generally range from 0 to 2 percent.

This map unit makes up about 21 percent of the county. It is about 44 percent Beaucoup and similar soils, 21 percent Ambraw and similar soils, 19 percent Dockery and similar soils, and 16 percent soils of minor extent.

The Beaucoup soils are poorly drained and are on broad flats or in sloughs. Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsurface layer to a depth of about 18 inches is very dark gray, firm silty clay loam about 8 inches thick. The subsoil is multicolored, firm silty clay loam about 32 inches thick. The substratum to a depth of 60 inches or

more is mottled light brownish gray and grayish brown, friable sandy clay loam.

The Ambraw soils are poorly drained and are on broad flats and in low-lying areas. Typically, the surface layer is very dark gray, firm clay loam about 9 inches thick. The next layer to a depth of 14 inches is very dark gray, mottled, firm clay loam. The subsoil is mottled, friable clay loam to a depth of about 48 inches. The upper part is dark gray, and the lower part is gray. The substratum to a depth of 60 inches or more is mottled gray, strong brown, and light gray, friable, stratified clay loam and loam.

The Dockery soils are somewhat poorly drained and are on flats or in sloughs. Typically, the surface layer is stratified dark grayish brown, very dark grayish brown, and brown, mottled, friable silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is stratified, mottled, and friable. The upper part is dark grayish brown, very dark grayish brown, and brown silt loam; the next part is very dark grayish brown and grayish brown silty clay loam; and the lower part is very dark grayish brown, dark grayish brown, and grayish brown silty clay loam.

Of minor extent in this map unit are the Landes, Medway, and Ross soils. The Landes and Ross soils are well drained and are on convex rises. The Medway soils are moderately well drained and are on flats and ridges.

The Beaucoup, Ambraw, and Dockery soils are used mainly for cultivated crops. They are used as woodland in some areas. Rarely flooded areas of these soils are well suited to the crops commonly grown. Frequently flooded areas are poorly suited, and frequently flooded, unprotected areas are not suited. The main concerns in management are wetness, flooding, and tilth. Beaucoup soils are moderately well suited to woodland, and Dockery soils are moderately suited.

Because of the flooding hazard, the soils in this map unit are not suited to use as sites for dwellings. Rarely flooded areas of these soils are poorly suited to use as sites for septic tank absorption fields, and frequently flooded areas are not suited.

Broad Land Use Considerations

The soils in Cass County vary widely in their suitability for major land uses. Most of the acreage is used for cultivated crops, primarily corn and soybeans. The major soils in map units 4, 5, 6, and 9 generally are well suited to cultivated crops. Water erosion is a hazard in the Ipava-Tama and Worthen-Littleton-Raddle map units, and a seasonal high water table is the main limitation in the Hartsburg-Sable-Ipava map unit. The Beaucoup, Ambraw, and Dockery soils in map unit 9 are subject to flooding, mainly in spring in some areas. The flood water can delay planting and cause slight to moderate crop damage. The seasonal high water table is the major limitation affecting the use of these soils for cultivated crops. Because of the hazard of water erosion, the soils in map unit 1 generally are poorly suited to cultivated crops, those in map unit 3 are moderately suited to poorly suited, and those in map unit 2 are not suited. The soils in map units 7 and 8 are poorly suited or not suited to cultivated crops mainly because of the low available water capacity and the hazard of soil blowing.

A small acreage of Cass County is pastureland. All of the soils in the county are suitable for grasses and legumes. A low available water capacity is the principal limitation to the use of the soils in map units 7 and 8. Pasture rotation, or other measures that prevent overgrazing, and drought-tolerant forage can help to overcome this limitation.

A moderate amount of the county is woodland. These areas are primarily on side slopes adjacent to creeks and streams. All the soils have good or excellent suitability for trees. On some soils, equipment limitations are moderate or severe because of wetness or steepness of slope. These limitations can be overcome by harvesting during drier periods and by using special equipment. Seedling mortality is also moderate on the soils in map units 7 and 8 because of a low available water capacity. Timely planting and control of plant competition around new seedlings help to overcome this limitation.

Some areas in the county are developed or built up for urban uses. In general, the Raddle and Worthen soils in map unit 6 are the best soils for these uses. In map units 1, 2, and 3, steepness of slope is the main limitation, and in map units 4 and 5, wetness is the main limitation. The soils in map units 7 and 8 are poorly suited to onsite waste disposal because of the hazard of ground water contamination. Soils on flood plains, such as those in map unit 9, are generally not suitable for urban development because of the hazard of flooding.

The soils in Cass County range from well suited to not suited to recreational development. The suitability depends partly upon the intensity of the expected use. The Raddle and Worthen soils in map unit 6 are well suited to intensive recreation uses. Other soils are limited because of steepness of slope or wetness. The soils in map unit 9 are not suited to recreational development because of the hazard of flooding.

The suitability for wildlife habitat generally is good throughout the county. Soils in map units 1, 2, 3, 4, 5, 6, and 9 generally are well suited to use as habitat for openland and woodland wildlife. The soils in map units 5 and 9 are well suited to use as habitat for wetland wildlife.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Tama silt loam, 5 to 10 percent slopes, eroded, is a phase of the Tama series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Sylvan-Bold complex, 5 to 10 percent slopes, severely eroded, is an example.

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

The names of the map units identified on the detailed soil maps of this county do not fully agree with those map units identified on the detailed soil maps in the published soil surveys of the adjacent Menard, Morgan, and Sangamon Counties. Differences result from variation in the extent of soils and soil phases. Because the soil series are similar or the same, these differences do not significantly affect the use of the maps for detailed planning of land uses.

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

Soil Descriptions

8E—Hickory loam, 15 to 30 percent slopes. This soil is steep and is well drained. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 180 acres.

Typically, the surface layer is dark grayish brown, friable loam about 3 inches thick. The subsurface layer to a depth of about 9 inches is friable loam that is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil extends to a depth of about 47 inches. It is firm clay loam that is strong brown in the upper part and yellowish brown in the lower part. The underlying material to a depth of 60 inches or more is yellowish brown, firm loam. In some areas, this soil has less sand. A seasonal high water table is within a depth of 4 feet in some areas.

Included with this soil in mapping are small areas of Arenzville and Radford soils. These soils are on flood plains. The Arenzville soils are moderately well drained, and the Radford soils are somewhat poorly drained. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. The available water capacity is high. Organic matter content is moderately low.

This Hickory soil is used mainly as pastureland or woodland. It is moderately suited to pasture and hay and well suited to woodland. Because of the steepness of slope, this soil generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but water erosion control is needed when grasses and legumes are established. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling water erosion. The plants should not be grazed or clipped until they are sufficiently established. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help keep the pasture and the soil in good condition.

Because of the steepness of slope, the water erosion hazard and the equipment use limitation are concerns in managing this soil for timber production. Plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome the problems caused by slope and also helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding bare areas to grass or a grass-legume mixture after completion of logging operations helps to control erosion. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of leaf mulch.

This Hickory soil is in capability subclass VIe.

8G—Hickory loam, 30 to 60 percent slopes. This soil is very steep and is well drained. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 215 acres.

Typically, the surface layer is very dark grayish brown, dark grayish brown, and brown, friable loam about 4 inches thick. The subsurface layer to a depth of about 12 inches is friable loam that is brown and dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil to a depth of 60 inches is firm. The upper part is yellowish brown clay loam, and the lower part is yellowish brown and brown loam. In some places, this soil has less sand, and in others, it has a thinner solum. In some areas, this soil has slope of less than 30 percent. In a few areas, a seasonal high water table is 4 to 6 feet below the surface.

Included with this soil in mapping are small areas of Arenzville, Bold, and Radford soils. Arenzville and Radford soils are on flood plains. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. Bold soils are on side slopes at a higher elevation than the Hickory soils and are calcareous. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. The available water capacity is high. Organic matter content is moderately low.

This Hickory soil is used mainly as woodland. In some areas, it is used for pasture. This soil is poorly suited to pasture and well suited to woodland. Because of the very steep slope, it generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

If this soil is used for pasture, water erosion is a major hazard. Because large machinery generally cannot cross the short, very steep slopes, the only methods of seeding, applying fertilizer, and spraying are by airplane and by hand. A ground cover is essential to control water erosion. Proper stocking, deferred grazing, fertilizing, and rotation grazing help to maintain the pasture and to control water erosion.

Because of the steepness of slope, the water erosion hazard and the equipment use limitation are concerns in managing this soil for timber production. Plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome the problems caused by slope and also helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding bare areas to grass or a grass-legume mixture after completion of logging operations helps to control erosion. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent reduction or destruction of

the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Hickory soil is in capability subclass VIIe.

17A—Keomah silt loam, 0 to 3 percent slopes. This soil is nearly level and is somewhat poorly drained. It is on broad upland flats. The areas of this soil are irregular in shape and range from 3 to 110 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer to a depth of about 14 inches is mottled, friable silt loam that is grayish brown in the upper part and brown in the lower part. The subsoil extends to a depth of more than 60 inches. It is mottled. The upper part is brown, firm silty clay loam. The next part is multicolored, firm silty clay loam. The lower part is grayish brown, firm and friable silt loam. In some areas, the surface layer is darker, and in others, the subsoil has less clay. The seasonal high water table is within a depth of 2 feet in some areas and is below a depth of 4 feet in others.

Included with this soil in mapping are small areas of Fayette soils. These soils are on narrow ridgetops and slight rises adjacent to the Keomah soil and are well drained. The included soils make up 2 to 5 percent of the map unit.

Water and air move through the Keomah soil at a moderately slow to slow rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table generally is 2 to 4 feet below the surface. The available water capacity is very high. Organic matter content is moderately low. In cultivated areas, the surface layer tends to crust after hard rains. Shrink-swell potential is high.

This Keomah soil is used mainly for cultivated crops. In some areas, it is used for pasture. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water intake.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Subsurface tile drains can lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, and fertilizing help to keep the pasture in good condition and to control erosion.

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

The moderately slow or slow permeability and the seasonal high water table limit the use of this soil as sites for septic tank absorption fields. Tile drains can lower the water table. Enlarging the absorption field helps to overcome the moderately slow or slow permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

This Keomah soil is in capability subclass IIw.

19C3—Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded. This soil is sloping and is well drained. It is on side slopes of uplands. Over most of the area, the original surface layer has been removed by water erosion and tillage has mixed the rest with the upper part of the subsoil. The areas of this soil are linear and range from 3 to 35 acres.

Typically, the surface layer is mixed brown and yellowish brown, firm silty clay loam about 8 inches thick. The subsoil to a depth of 29 inches is yellowish brown, friable silt loam. It is mottled in the lower part. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, mottled, friable, calcareous silt loam. In some areas, this soil has a silt loam surface layer, and in others, the subsoil extends to a depth of more than 40 inches.

Included with this soil in mapping are small areas of Arenzville and Bold soils. Arenzville soils are in drainageways, and Bold soils are on side slopes at a lower elevation than the Sylvan soil. Arenzville soils are moderately well drained, and Bold soils are calcareous. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Sylvan soil at a moderate rate. In cultivated areas, surface runoff is

medium. The available water capacity is very high. Organic matter content is low. The surface layer is compact and cloddy if plowed when the soil is too wet.

This Sylvan soil is used mainly for cultivated crops. In some areas, it is used for pasture and hay. This soil is poorly suited to cultivated crops. It is well suited to pasture and hay and to use as sites for dwellings and septic tank absorption fields.

In the areas of this soil that are used for corn, soybeans, or small grains, further water erosion is a severe hazard. Such practices as crop rotation, conservation tillage, contour farming, and terracing help to control water erosion and to maintain soil productivity. Crop rotations should include close-growing grasses and legumes for at least 1 year. Keeping tillage at a minimum and returning crop residue to the soil or regularly adding other organic material improve soil tilth and fertility and increase the rate of water intake.

This soil is suited to adapted forage and hay plants, such as orchardgrass, bromegrass, tall fescue, alfalfa, and ladino clover. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to water erosion. Tilling on the contour to prepare a seedbed or renovate the pasture helps to control water erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

This Sylvan soil is in capability subclass IVe.

19D2—Sylvan silt loam, 10 to 15 percent slopes, eroded. This soil is strongly sloping and is well drained. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 50 acres.

Typically, the surface layer is mixed very dark grayish brown and dark grayish brown, friable silt loam about 4 inches thick. Much of the original surface layer has been removed by water erosion. The subsurface layer to a depth of about 9 inches is dark brown, friable silt loam. It has some dark yellowish brown subsoil material. The subsoil is friable. It extends to a depth of about 31 inches. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam. In some areas, this soil has a thinner and darker surface layer, and in severely eroded areas, it has a silty clay loam surface layer. In some places, the subsoil extends to a depth of more than 40 inches.

Included with this soil in mapping are small areas of Arenzville, Bold, and Radford soils. Arenzville and Radford soils are in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. Bold soils are on side slopes at a lower elevation than the Sylvan soil and are calcareous. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Sylvan soil at a moderate rate. In cultivated areas, surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low. The surface layer tends to crust after hard rains.

This Sylvan soil is used mainly for cultivated crops or pasture. It is moderately suited to cultivated crops, pasture, and hay and is well suited to woodland. This soil is moderately suited to use as sites for dwellings and septic tank absorption fields.

Further water erosion is a hazard if this soil is used for corn, soybeans, or small grains. Also, tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation dominated by forage crops and by a combination of contour farming and conservation tillage. Stripcropping also helps to control water erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil productivity, to prevent crusting, and to improve soil tilth.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa; however, erosion control is needed when grasses and legumes are established. A no-till method of seeding or pasture renovation helps to establish forage species and to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help keep the pasture and the soil in good condition.

Plant competition is a concern in managing this soil for timber production, but competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

Steepness of slope is a limitation to the use of this soil as sites for dwellings or septic tank absorption fields. Alteration of the slope by cutting, filling, and land shaping helps to overcome this limitation on sites for dwellings. Filter lines need to be installed on the contour to overcome the slope on sites for septic tank absorption fields.

This Sylvan soil is in capability subclass IIIe.

19D3—Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded. This soil is strongly sloping and is well drained. It is on side slopes of uplands. Over most of the area, the original surface layer has been removed by water erosion and tillage has mixed the rest with the upper part of the subsoil. The areas of this soil are linear and range from 3 to 40 acres.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silty clay loam about 4 inches thick. The subsoil extends to a depth of about 27 inches. It is yellowish brown and friable. The upper part is silty clay loam, and the lower part is silt loam. The underlying material to a depth of 60 inches or more is pale brown, mottled, friable, calcareous silt loam. In some areas, the subsoil has less clay, and in others, this soil has slope of less than 10 percent.

Included with this soil in mapping are small areas of Arenzville, Bold, and Radford soils. Arenzville and Radford soils are in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. Bold soils are on side slopes at a lower elevation than the Sylvan soil and are calcareous. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Sylvan soil at a moderate rate. In cultivated areas, surface runoff is rapid. The available water capacity is very high. Organic matter content is low. The surface layer can become compact and cloddy if plowed when the soil is too wet.

This Sylvan soil is used mainly for cultivated crops. In some areas, it is used for pasture. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to use as sites for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, further water erosion is a hazard. Such practices as crop rotation, conservation tillage, contour farming, and terracing help to control erosion and thus to maintain the productivity of the soil. Crop rotations should include close-growing grasses and legumes. Keeping tillage at a minimum and returning crop residue to the soil or regularly adding other organic material improve tilth and fertility and increase the rate of water intake.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Contour tillage and a no-till system of seeding help to control erosion when a seedbed is prepared or the pasture is renovated. Using a nurse crop, such as rye, and applying fertilizer help to establish and to maintain the pasture. The plants should not be grazed or clipped until they are sufficiently established.

Steepness of slope limits the use of this soil as sites for dwellings or septic tank absorption fields. Cutting and filling help to overcome this limitation on sites for dwellings. Filter lines need to be installed on the contour to overcome the slope on sites for septic tank absorption fields.

This Sylvan soil is in capability subclass IVe.

19E—Sylvan silt loam, 15 to 30 percent slopes. This soil is steep and is well drained. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 50 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer to a depth of about 10 inches is friable silt loam that is dark brown in the upper part and dark brown and dark yellowish brown in the lower part. The subsoil extends to a depth of about 27 inches. The upper part is dark yellowish brown, firm silty clay loam; the next part is yellowish brown, firm silty clay loam; and the lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is mottled, friable, calcareous silt loam that is yellowish brown in the upper part and light brownish gray in the lower part. In some areas, this soil has less clay in the subsoil, and in others, it has more sand throughout the profile. In some places, the solum is thicker.

Included with this soil in mapping are small areas of Arenzville and Bold soils. Arenzville soils are in drainageways and are moderately well drained. Bold soils are on side slopes at a lower elevation than the Sylvan soil and are calcareous. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Sylvan soil at a moderate rate. In pastures, surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

This Sylvan soil is used mainly as woodland or pastureland. It is moderately suited to pasture and hay and moderately well suited to woodland. Because of the steepness of slope, this soil generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control water erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a

no-till seeding system improves forage quality and helps to control erosion. Machinery is difficult to operate on the steeper slopes. Planting suitable species, proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain the pasture.

Because of the steepness of slope, the water erosion hazard, equipment use limitation, and seedling mortality are concerns in managing this soil for timber production. Plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome the problems caused by slope and also helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding all bare areas to grass or to a grass-legume mixture after completion of logging operations helps to control erosion. Machinery should be used only when the soil is firm enough to support the equipment. Seedling mortality can be reduced if all vegetation within 2 feet of the existing or planted seedlings is eliminated and if older and larger stock is planted. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Sylvan soil is in capability subclass VIe.

30F—Hamburg silt loam, 20 to 35 percent slopes. This soil is steep, somewhat excessively drained, and calcareous. It is on dissected uplands near major streams. The areas of this soil are linear or irregular in shape and range from 3 to 230 acres.

Typically, the surface layer is dark brown, friable silt loam about 6 inches thick. The underlying material extends to a depth of more than 60 inches. It is, in sequence downward, dark yellowish brown, friable silt loam; yellowish brown, friable silt loam; light yellowish brown, very friable silt loam; and light yellowish brown, very friable very fine sandy loam. In some areas, this soil has more clay, and in others, the upper part of the profile is not calcareous.

Included with this soil in mapping are small areas of Arenzville and Plainfield soils. Arenzville soils are in drainageways and are moderately well drained. Plainfield soils are in positions similar to those of the Hamburg soil, and they are sandy and excessively drained. The included soils make up 1 to 10 percent of the map unit.

Water and air move through the Hamburg soil at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

This Hamburg soil is used mainly as woodland. In some areas, it is used for pasture. This soil is moderately suited to pasture and very poorly suited to woodland. Because of the steepness of slope, it generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control water erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a no-till seeding system improves forage quality and helps to control erosion. Machinery is difficult to operate on the steeper slopes. Planting suitable species, proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain the pasture.

Because of the steepness of slope, the water erosion hazard and equipment use limitation are concerns in managing this soil for timber production. Seedling mortality is a concern on soils facing the south and west because of the low available water capacity. Laying out logging roads and skid trails on the contour helps to overcome the problems caused by slope and also helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding bare areas to grass or to a grass-legume mixture after completion of logging operations helps to control erosion. Machinery should be used only when the soil is firm enough to support the equipment. Seedling mortality can be reduced if all vegetation within 2 feet of the existing or planted seedlings is eliminated and if older and larger stock is planted. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Hamburg soil is in capability subclass VIIe.

30G—Hamburg silt loam, 35 to 60 percent slopes. This soil is very steep, somewhat excessively drained, and calcareous. It is on dissected uplands near major streams. Catsteps are common (fig. 6). The areas of this soil are linear or irregular in shape and range from 3 to 455 acres.

Figure 6.—Catsteps in an area of Hamburg silt loam, 35 to 60 percent slopes.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The underlying material to a depth of 60 inches or more is friable. It is, in sequence downward, brown silt loam, yellowish brown silt, and light yellowish brown silt. In some areas, this soil has more clay, and in others, the upper part of the profile is not calcareous.

Included with this soil in mapping are small areas of the Arenzville and Plainfield soils. Arenzville soils are on flood plains and are moderately well drained. Plainfield soils are in positions similar to those of the Hamburg soil, and they are sandy and excessively drained. The included soils make up 1 to 10 percent of the map unit.

Water and air move through the Hamburg soil at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

This Hamburg soil is used mainly for pasture. In some areas, it is used as woodland. This soil is poorly suited to pasture and very poorly suited to woodland. Because of the very steep slope, this soil generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but water erosion is a major hazard. Some kind of ground cover is essential to control erosion. Because large machinery generally cannot cross the short, very steep slopes, the only methods of seeding, fertilizing, and spraying are by airplane and by hand. Proper stocking, deferred grazing, fertilizing, and rotation grazing help to maintain the pasture and to control erosion.

Because of the steep slope, the water erosion hazard and equipment use limitation are concerns in managing this soil for timber production. Seedling mortality is a concern on soils facing the south and west because of the low available water capacity. Laying out logging roads and skid trails on the contour helps to overcome the problems caused by slope and also helps to control water erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding bare areas to grass or to a grass-legume mixture after completion of logging operations helps to control erosion. Machinery should be used only when the soil is firm enough to

support the equipment. Seedling mortality can be reduced if all vegetation within 2 feet of the existing or planted seedlings is eliminated and if older and larger stock is planted. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Hamburg soil is in capability subclass VIIe.

34D—Tallula silt loam, 7 to 15 percent slopes. This soil is strongly sloping and is well drained. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 65 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil to a depth of 26 inches is friable silt loam that is brown in the upper part and yellowish brown in the lower part. The substratum is mottled, friable, and calcareous. The upper part is pale brown silt loam, and the lower part to a depth of 60 inches or more is light brownish gray silt. In some areas, the surface layer is lighter in color, and in others, the solum is thicker. In some places, the subsoil has more clay.

Included with this soil in mapping are small areas of Bold and Radford soils. Bold soils are on side slopes at a lower elevation than the Tallula soil and are calcareous. Radford soils are in drainageways and are somewhat poorly drained. The included soils make up 2 to 5 percent of the map unit.

Water and air move through the Tallula soil at a moderate rate. In cultivated areas, surface runoff is rapid. The available water capacity is very high. Organic matter content is moderate.

This Tallula soil is used mainly for cultivated crops, pasture, or hay. It is moderately suited to cultivated crops and well suited to pasture and hay. This soil is moderately suited to use as sites for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, water erosion is a hazard. Such practices as crop rotation, conservation tillage, contour farming, and terracing help to control water erosion and thus to maintain the productivity of the soil. Crop rotations should include at least 1 year of forage crops. Keeping tillage at a minimum and returning crop residue to the soil help to maintain soil tilth and fertility and increase the rate of water infiltration.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a no-till seeding system improves forage quality and helps to control erosion. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain the pasture.

Steepness of slope limits the use of this soil as sites for dwellings or septic tank absorption fields. Alteration of the slope by cutting, filling, and land shaping helps to overcome this limitation on sites for dwellings. Filter lines need to be installed on the contour to overcome the slope on sites for septic tank absorption fields.

This Tallula soil is in capability subclass IIIe.

35D2—Bold silt loam, 7 to 15 percent slopes, eroded. This soil is strongly sloping, well drained, and calcareous. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 265 acres.

Typically, the surface layer is yellowish brown, friable silt loam about 8 inches thick. Part of the original surface layer has been removed by water erosion. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam. In some areas, this soil has less clay, and in others, carbonates are at a depth of more than 10 inches.

Included with this soil in mapping are small areas of Arenzville, Radford, and Sylvan soils. These soils are not calcareous within a depth of 20 inches. Arenzville and Radford soils are in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. Sylvan soils have more clay in the profile and are on side slopes at a higher elevation than the Bold soil. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Bold soil at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low. In cultivated areas, the surface layer tends to crust after hard rains.

This Bold soil is used mainly for cultivated crops. In some areas, it is used for pasture. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to use as sites for dwellings and septic tank absorption fields.

Further water erosion is a hazard if this soil is used for corn, soybeans, or small grains. Also, tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation dominated by forage crops and by a combination of contour farming and conservation tillage.

Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil productivity, to prevent crusting, and to improve soil tilth.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a no-till seeding system improves forage quality and helps to control erosion. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain the pasture.

Steepness of slope limits the use of this soil as sites for dwellings or septic tank absorption fields. Alteration of the slope by cutting, filling, and land shaping helps to overcome this limitation on sites for dwellings. Filter lines need to be installed on the contour to overcome the slope on sites for septic tank absorption fields.

This Bold soil is in capability subclass IIIe.

35E2—Bold silt loam, 15 to 30 percent slopes, eroded. This soil is steep, well drained, and calcareous. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 145 acres.

Typically, the surface layer is brown, friable silt loam about 4 inches thick. Part of the original surface layer has been removed by water erosion. The underlying material to a depth of 60 inches or more is mottled, friable silt loam that is yellowish brown and light brownish gray in the upper part and light brownish gray in the lower part. In some areas, this soil has less clay.

Included with this soil in mapping are small areas of Arenzville, Radford, and Sylvan soils. These soils are not calcareous within a depth of 20 inches. Arenzville and Radford soils are in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. Sylvan soils have more clay in the profile and are on side slopes at a higher elevation than the Bold soil. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Bold soil at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

This Bold soil is used mainly for pasture. In some areas, it is used for cultivated crops. This soil is moderately suited to pasture and hay. Because of the steepness of slope, it generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a no-till seeding system improves forage quality and helps to control erosion. Machinery is difficult to operate on the steeper slopes. Planting suitable species, proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain the pasture.

This Bold soil is in capability subclass VIe.

36A—Tama silt loam, 0 to 2 percent slopes. This soil is nearly level and is moderately well drained. It is on flats and ridges of uplands. The areas of this soil are irregular in shape and range from 3 to 100 acres.

Typically, the surface layer is very dark gray, friable silt loam about 6 inches thick. The subsurface layer to a depth of 12 inches is very dark gray, friable silt loam. The subsoil extends to a depth of 60 inches or more. The upper part is very dark grayish brown, friable silty clay loam; the next part is dark brown and yellowish brown, firm silty clay loam; and the lower part is yellowish brown, mottled, firm silt loam. In some areas, this soil has slope of more than 2 percent. The seasonal high water table is within a depth of 4 feet in some areas.

Included with this soil in mapping are small areas of Sable soils in shallow depressions. These soils are poorly drained. They make up 2 to 5 percent of the map unit.

Water and air move through the Tama soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 4 to 6 feet below the surface. The available water capacity is very high. Organic matter content is moderate. Shrink-swell potential is moderate.

This Tama soil is used mainly for cultivated crops. In some areas, it is used for pasture and hay. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as sites for dwellings and septic tank absorption fields.

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

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa. Overgrazing reduces forage

production and causes surface compaction and poor tilth. Proper stocking, rotation grazing, deferred grazing, and applying fertilizer and lime help to maintain the pasture and the soil.

The moderate shrink-swell potential is a limitation for the use of this soil as sites for dwellings, and the seasonal high water table is a limitation for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling. The water table can be lowered if subsurface tile drains are installed near the foundation of dwellings with basements.

The seasonal high water table and the moderate permeability limit the use of this soil as sites for septic tank absorption fields. Subsurface tile drains can lower the water table. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

This Tama soil is in capability class I.

36B—Tama silt loam, 2 to 5 percent slopes. This soil is gently sloping and is well drained. It is on ridges and side slopes of uplands. The areas of this soil are linear or irregular in shape and range from 3 to 310 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown, friable silt loam. The subsoil to a depth of 60 inches or more is friable. The upper part is dark yellowish brown silty clay loam, and the lower part is dark yellowish brown and yellowish brown silty clay loam and silt loam. In some areas, this soil is calcareous within a depth of 40 inches, and in others, it has slope of less than 2 percent or more than 5 percent. In a few areas, a seasonal high water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the Ipava and Sable soils. These soils are in broad, flat areas at a lower elevation than the Tama soil. Ipava soils are somewhat poorly drained, and Sable soils are poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Tama soil at a moderate rate. In cultivated areas, surface runoff is medium. The available water capacity is very high. Organic matter content is moderate. Shrink-swell potential is moderate.

This Tama soil is used mainly for cultivated crops. It is well suited to cultivated crops, pasture, and hay. This soil is moderately suited to use as sites for dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grains, water erosion is a hazard. Erosion can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface, by contour farming, or by terracing. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and fertility.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking, rotation grazing, and deferred grazing help to control erosion. Fertilizer and lime help to maintain the pasture and the soil.

The moderate shrink-swell potential limits the use of this soil as sites for dwellings. Reinforcing the foundation helps to prevent structural damage caused by shrinking and swelling.

The moderate permeability limits the use of this soil as sites for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

This Tama soil is in capability subclass IIe.

36C2—Tama silt loam, 5 to 10 percent slopes, eroded. This soil is sloping and is well drained. It is on side slopes and ridges of uplands. The areas are linear or irregular in shape and range from 3 to 125 acres.

Typically, the surface layer is mixed very dark grayish brown and dark brown, friable silt loam about 11 inches thick. The subsoil to a depth of 44 inches is friable. The upper part is dark brown silty clay loam, the next part is dark yellowish brown silty clay loam, and the lower part is dark yellowish brown silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam. In some areas, this soil has a thinner surface layer, and in others, the soil is calcareous within a depth of 40 inches. In some places, a seasonal high water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the Bold and Radford soils. Bold soils are calcareous and are on side slopes at a lower elevation than the Tama soil. Radford soils are in drainageways and are somewhat poorly drained. The included soils make up 1 to 5 percent of the map unit.

Water and air move through the Tama soil at a moderate rate. In cultivated areas, surface runoff is medium. The available water capacity is very high. Organic matter content is moderate. Shrink-swell potential is moderate.

This Tama soil is used mainly for cultivated crops. In some areas, it is used for pasture and hay. This soil is moderately suited to cultivated crops and well suited to pasture and hay. It is moderately suited to use as sites for dwellings and septic tank absorption fields.

Water erosion control is needed in the areas of this soil that are used for corn, soybeans, or small grains. Such practices as conservation tillage, contour farming, terracing, and crop rotations help to control erosion. At least 1 year of forage crops should be included in crop rotations. Tilling when the soil is wet causes surface cloddiness, compaction, and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain soil tilth.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate a pasture also helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

The moderate shrink-swell potential limits the use of this soil as sites for dwellings. Reinforcing the foundation helps to prevent structural damage caused by shrinking and swelling.

The moderate permeability limits the use of this soil as sites for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

This Tama soil is in capability subclass IIIe.

37—Worthen silt loam. This soil is nearly level and is well drained. It is on alluvial fans and stream terraces. The areas of this soil are irregular in shape and range from 3 to 1,880 acres.

Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsurface layer to a depth of 31 inches is friable silt loam that is very dark grayish brown in the upper part and dark brown in the lower part. The subsoil to a depth of 58 inches is friable silt loam that is dark brown in the upper part, dark yellowish brown in the middle part, and yellowish brown in the lower part. The underlying material to a depth of 60 inches or more is yellowish brown, friable, calcareous silt loam. In some areas, this soil has a thinner subsurface layer, and in others, it has more clay in the subsoil. In some places, a seasonal high water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the Littleton soils. These soils are in slightly lower positions than those of the Worthen soil and are somewhat poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move though the Worthen soil at a moderate rate. In cultivated areas, surface runoff is slow. The available water capacity is very high. Organic matter content is moderate.

This Worthen soil is used mainly for cultivated crops. It is well suited to cultivated crops and to use as sites for dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grains. Conservation tillage helps to maintain soil tilth and productivity.

This Worthen soil is in capability class I.

43A—Ipava silt loam, 0 to 2 percent slopes. This soil is nearly level and is somewhat poorly drained. It is on broad upland flats. The areas of this soil are irregular in shape and range from 3 to 2,200 acres.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer to a depth of 21 inches is very dark gray, firm silty clay loam. The subsoil extends to a depth of about 52 inches. It is mottled and firm. The upper part is multicolored silty clay loam, and the lower part is light brownish gray and light yellowish brown silt loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam. In some areas, a seasonal high water table is within a depth of 1 foot, and in others, it is below a depth of 3 feet.

Included with this soil in mapping are small areas of Tama soils on slight rises at a higher elevation than the Ipava soil. These soils are well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Ipava soil at a moderately slow rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is very high. Organic matter content is high. Shrink-swell potential is high.

This Ipava soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grains. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Conservation tillage helps to maintain tilth and fertility.

The seasonal high water table and the high shrink-swell potential are limitations to the use of this soil as sites for dwellings. Installing subsurface tile drains near the foundation helps to overcome the wetness. Extending footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The moderately slow permeability and the seasonal high water table are limitations if this soil is used as a septic tank absorption field. Tile drains can lower the water table, and enlarging the absorption field helps to overcome the moderately slow permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

This Ipava soil is in capability class I.

43B—Ipava silt loam, 2 to 5 percent slopes. This soil is gently sloping and is somewhat poorly drained. It is on ridges and side slopes of uplands. The areas of this soil are linear or irregular in shape and range from 3 to 40 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer to a depth of 17 inches is very dark grayish brown, friable silt loam. The subsoil is mottled and extends to a depth of about 53 inches. The upper part is dark grayish brown and dark brown, firm silty clay loam; the next part is brown, firm silty clay loam; and the lower part is pale brown, friable silt loam. The underlying material to a depth of 60 inches or more is pale brown, mottled, friable silt loam. In some areas, this soil does not have a subsurface layer. In some areas, a seasonal high water table is within a depth of 1 foot, and in others, it is below a depth of 3 feet.

Included with this soil in mapping are small areas of the Tama soils on ridgetops or side slopes at a higher elevation than the Ipava soil. These soils are well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Ipava soil at a moderately slow rate. In cultivated areas, surface runoff is medium. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is very high. Organic matter content is high. Shrink-swell potential is high.

This Ipava soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, water erosion is a hazard, particularly in areas near drainageways. Also, the seasonal high water table can delay planting in some years. Conservation tillage helps to maintain soil productivity and soil tilth and also helps to control erosion. A drainage system helps to dry out the soil in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available.

The seasonal high water table and the high shrink-swell potential are limitations to the use of this soil as sites for dwellings. Subsurface tile drains near the foundation help to overcome the wetness. Extending footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

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

This Ipava soil is in capability subclass IIe.

49—Watseka sand. This soil is nearly level and is somewhat poorly drained. It is on stream terraces. The areas of this soil are irregular in shape and range from 3 to 55 acres.

Typically, the surface layer is very dark grayish brown, very friable sand about 7 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown, very friable sand. The subsoil to a depth of about 36 inches is sand. The upper part is dark grayish brown and is very friable; the next part is dark grayish brown, mottled, and is very friable; and the lower part is grayish brown, mottled, and is loose. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, loose sand. In some areas, this soil has more clay throughout.

Included with this soil in mapping are small areas of the Gilford and Sparta soils. Gilford soils are in lower positions than those of the Watseka soil and are very poorly drained. Sparta soils are in higher positions and are excessively drained. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Watseka soil at a rapid rate. In cultivated areas, surface runoff is very slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is low. Organic matter content is moderately low.

This Watseka soil is used mainly for cultivated crops and is moderately suited to this use. This soil is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains,

soil blowing is a hazard and the low available water capacity is a limitation. Conservation tillage helps to control soil blowing and to conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and improve soil fertility.

The seasonal high water table limits the use of this soil as sites for dwellings. Subsurface tile drains near the foundation help to overcome this limitation.

If this soil is used as sites for septic tank absorption fields, the seasonal high water table is a limitation and ground water contamination is a hazard. Underground drains can lower the water table. A septic system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

This Watseka soil is in capability subclass IIIs.

53B—Bloomfield fine sand, 1 to 7 percent slopes. This soil is gently sloping and is somewhat excessively drained. It is on uplands and stream terraces. The areas of this soil are irregular in shape and range from 3 to 585 acres.

Typically, the surface layer is dark brown, very friable fine sand about 9 inches thick. The subsurface layer to a depth of about 36 inches is yellowish brown, loose loamy fine sand. Between depths of 36 and 60 inches are alternate bands of yellowish brown and dark yellowish brown, very friable loamy fine sand and dark brown, friable fine sandy loam. In some areas, the surface layer is darker and thicker.

Included with this soil in mapping are small areas of the Alvin and Orio soils. Alvin soils are in positions similar to those of the Bloomfield soil and are well drained. Orio soils are in shallow depressions and are poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Bloomfield soil at a rapid rate. In cultivated areas, surface runoff is slow. The available water capacity is low. Organic matter content is low.

This Bloomfield soil is used mainly for cultivated crops. In some areas, it is used as woodland or for specialty crops, such as melons and pumpkins. This soil is moderately suited to cultivated crops and to woodland. It is well suited to specialty crops and to use as sites for dwellings. It is poorly suited to use as sites for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, soil blowing is a hazard and the low available water capacity and low fertility level are limitations. Conservation tillage helps to control soil blowing and to conserve moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and improve soil fertility.

Because of the low available water capacity, seedling mortality is a concern in managing this soil for timber production. Seedling mortality can be reduced if drought-tolerant species are planted, if all vegetation within 2 feet of the existing or planted seedlings is eliminated, and if older and larger stock is planted. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

Soil blowing is a hazard in areas of this soil that are used for specialty crops, such as melons and pumpkins. Field windbreaks, border strips, and a surface mulch help to control soil blowing.

If this soil is used as sites for septic tank absorption fields, ground water contamination is a hazard. A septic system can function satisfactorily if a sealed sand filter and a disinfection tank or evapotranspiration bed are installed.

This Bloomfield soil is in capability subclass IIIs.

53D—Bloomfield fine sand, 7 to 15 percent slopes. This soil is strongly sloping and is somewhat excessively drained. It is on uplands and stream terraces. The areas of this soil are irregular in shape and range from 3 to 245 acres.

Typically, the surface layer is dark brown, very friable fine sand about 8 inches thick. The subsurface layer to a depth of about 34 inches is yellowish brown, loose fine sand. Between depths of 34 and 60 inches are alternate bands of yellowish brown and dark yellowish brown, loose fine sand and dark brown, very friable loamy fine sand. In some areas, the surface layer is darker and thicker.

Included with this soil in mapping are small areas of the Alvin and Orio soils. Alvin soils are in positions similar to those of the Bloomfield soil. They are well drained and have more clay throughout. Orio soils are in shallow depressions and are poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Bloomfield soil at a rapid rate. In cultivated areas, surface runoff is medium. The available water capacity is low. Organic matter content is low.

This Bloomfield soil is used mainly as woodland. In some areas, it is used for cultivated crops, pasture, or hay. This soil is poorly suited to cultivated crops. It is

moderately suited to pasture, hay, and woodland and to use as sites for dwellings. This soil is poorly suited to use as sites for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, water erosion and soil blowing are hazards. Also, the low available water capacity and the fertility level are limitations. Such practices as conservation tillage, contour farming, and terracing help to control erosion and to conserve moisture. Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and improve soil fertility.

Establishing pasture or hay in areas of this soil helps to control soil blowing and water erosion, but droughtiness is a limitation. Deep-rooting forage species, such as alfalfa and bromegrass, help to overcome droughtiness. Proper stocking, rotation grazing, deferred grazing, and applying fertilizer and lime help to maintain the pasture and the soil.

Because of the low available water capacity, seedling mortality is a concern in managing this soil for timber production. Seedling mortality is reduced if all vegetation within 2 feet of the existing or planted seedlings is eliminated and if older and larger stock is planted. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and destruction of the leaf mulch.

Steepness of slope is a limitation to the use of this soil as sites for dwellings. Land shaping by cutting and filling helps to overcome this limitation.

Steepness of slope is a limitation and ground water contamination is a hazard if this soil is used as sites for septic tank absorption fields. A septic system can function satisfactorily if the site is leveled and a sealed sand filter and a disinfection tank or evapotranspiration bed are installed.

This Bloomfield soil is in capability subclass IVe.

54B—Plainfield sand, 1 to 7 percent slopes. This soil is gently sloping and is excessively drained. It is on stream terraces and uplands. The areas of this soil are irregular in shape and range from 3 to 1,890 acres.

Typically, the surface layer is dark brown, very friable sand about 8 inches thick. The subsoil extends to a depth of about 32 inches. It is very friable sand that is dark yellowish brown in the upper part and dark yellowish brown and yellowish brown in the lower part. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand. In some areas, the surface layer is darker and thicker, and in others, the subsoil has more clay. In some places, this soil has a loamy sand surface layer.

Included with this soil in mapping are small areas of the Orio and Watseka soils. Orio soils are in shallow depressions. They are poorly drained and have more clay in the upper part of the profile than the Plainfield soil. Watseka soils are in flat areas and are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Plainfield soil at a rapid rate. In cultivated areas, surface runoff is slow. The available water capacity is low. Organic matter content is low.

This Plainfield soil is used mainly for cultivated crops, but it generally is not suited to this use because of soil blowing and the low available water capacity (fig. 7). This soil is well suited, however, to specialty crops, such as melons and pumpkins, and to use as sites for dwellings. It is moderately suited to woodland and is poorly suited to use as sites for septic tank absorption fields.

Soil blowing is a hazard if this soil is used for specialty crops, such as melons and pumpkins. Field windbreaks, border strips, and a surface mulch help to control soil blowing.

Because of the low available water capacity, seedling mortality is a concern in managing this soil for timber production. Plant competition is also a concern. Seedling mortality can be reduced if drought-tolerant species are planted, if all vegetation within 2 feet of the existing or planted seedlings is eliminated, and if older and larger stock is planted. Competition from undesirable vegetation can be reduced by chemical and mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

If this soil is used as sites for septic tank absorption fields, ground water contamination is a hazard. A septic system can function satisfactorily if a sealed sand filter and a disinfection tank or evapotranspiration bed are installed.

This Plainfield soil is in capability subclass VIs.

54D—Plainfield sand, 7 to 15 percent slopes. This soil is strongly sloping and is excessively drained. It is on stream terraces and uplands. The areas of this soil

Figure 7.—The low available water capacity of the Plainfield sand, 1 to 7 percent slopes, results in severe plant stress.

are irregular in shape and range from 3 to 130 acres.

Typically, the surface layer is dark brown, very friable sand about 7 inches thick. The subsoil to a depth of about 27 inches is sand. The upper part is dark yellowish brown and very friable, and the lower part is yellowish brown and loose. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand. In some areas, the subsoil has more clay, and in others, the surface layer is loamy sand.

Included with this soil in mapping are small areas of the Alvin and Orio soils. Alvin soils are in positions similar to those of the Plainfield soil. They have more clay throughout and are well drained. Orio soils are in shallow depressions and are poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Plainfield soil at a rapid rate. In cultivated areas, surface runoff is medium. The available water capacity is low. Organic matter content is low.

This Plainfield soil is used mainly as woodland or cropland. It generally is not suited to cultivated crops because of soil blowing and the low available water capacity. This soil is moderately suited to pasture, hay, and woodland and to use as sites for dwellings. It is poorly suited to use as sites for septic tank absorption fields.

Establishing pasture or hay in areas of this soil helps to control soil blowing and water erosion, but droughtiness is a limitation. Deep-rooting forage species, such as alfalfa and bromegrass, help to

overcome droughtiness. Proper stocking, rotation grazing, deferred grazing, and applying fertilizer and lime help to maintain the pasture and the soil.

Because of the low available water capacity, seedling mortality is a concern in managing this soil for timber production. Seedling mortality can be reduced if drought-tolerant species are planted, if all vegetation within 2 feet of the existing or planted seedlings is eliminated, and if older and larger stock is planted. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

Steepness of slope is a limitation to the use of this soil as sites for dwellings. Land shaping by cutting and filling helps to overcome this limitation.

If this soil is used as sites for septic tank absorption fields, steepness of slope is a limitation and ground water contamination is a hazard. A septic system can function satisfactorily if the site is leveled and a sealed sand filter and a disinfection tank or evapotranspiration bed are installed.

This Plainfield soil is in capability subclass VIs.

54E—Plainfield sand, 15 to 30 percent slopes. This soil is steep and is excessively drained. It is on side slopes of uplands and on stream terraces. The areas of this soil are linear or irregular in shape and range from 3 to 90 acres.

Typically, the surface layer is very dark grayish brown, very friable sand about 4 inches thick. The subsurface layer to a depth of about 6 inches is brown and dark brown, very friable sand. The subsoil to a depth of about 22 inches is yellowish brown sand that is very friable in the upper part and loose in the lower part. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand. In some areas, this soil has more clay in the subsoil, and in others, it has slope of more than 30 percent. In some places, the surface layer is loamy sand.

Included with this soil in mapping are small areas of Hamburg soils in higher positions on the landscape. These soils are somewhat excessively drained and calcareous. They make up 1 to 5 percent of the map unit.

Water and air move through the Plainfield soil at a rapid rate. In pastures, surface runoff is medium. The available water capacity is low. Organic matter content is low.

This Plainfield soil is used mainly as woodland. It is moderately suited to pasture, hay, and woodland. Because of the steepness of slope, this soil generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

Establishing pasture or hay in areas of this soil helps to control soil blowing and water erosion, but droughtiness is a limitation. Deep-rooting forage species, such as alfalfa and bromegrass, help to overcome droughtiness. Proper stocking, rotation grazing, deferred grazing, and applying fertilizer and lime help to maintain the pasture and the soil.

Because of the steepness of slope, the erosion hazard and equipment use limitation are concerns in managing this soil for timber production. Seedling mortality is a concern because of the low available water capacity, and plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome problems caused by the slope and also helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding bare areas to grass or to a grass-legume mixture after completion of logging operations helps to control erosion. Seedling mortality is reduced if drought-tolerant species are planted, if all vegetation within 2 feet of the existing or planted seedlings is eliminated, and if older and larger stock is planted. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Plainfield soil is in capability subclass VIIs.

68—Sable silty clay loam. This soil is nearly level and is poorly drained. It is on broad upland flats. This soil is ponded for brief periods from March to June. The areas of this soil are irregular in shape and range from 3 to 490 acres.

Typically, the surface layer is black, firm silty clay loam about 6 inches thick. The subsurface layer to a depth of 19 inches is black, firm silty clay loam that is mottled in the lower part. The subsoil to a depth of about 50 inches is mottled. The upper part is multicolored, firm silty clay loam, and the lower part is light brownish gray, friable silt loam. The underlying material to a depth of 60 inches or more is mottled light brownish gray and light olive brown, friable silt loam. In some areas, the subsurface layer is thinner, and in

others, the subsoil is calcareous within a depth of 35 inches. In some areas, a seasonal high water table is at a depth of more than 2 feet.

Included with this soil in mapping are small areas of Tama soils on slight rises. These soils are moderately well drained and well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Sable soil at a moderate rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 2 feet below. The available water capacity is very high. Organic matter content is high. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Sable soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction, and increase the rate of water intake.

If this soil is used as sites for dwellings, ponding is a hazard. This hazard can be reduced by diverting surface water from the site or by constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains can lower the water table.

Ponding and the seasonal high water table limit the use of this soil as sites for septic tank absorption fields. The depth to the seasonal high water table can be increased by adding as much as 2 feet of loamy fill material on the surface. Subsurface tile drains can also lower the water table. Installing a sealed sand filter and disinfection tank or evapotranspiration bed is an alternative.

This Sable soil is in capability subclass IIw.

70—Beaucoup silty clay loam, frequently flooded. This soil is nearly level and is poorly drained. It is on flood plains and is frequently flooded or ponded for long periods from March to June. Some areas of this soil are flooded for only brief periods. The areas of this soil are irregular in shape and range from 3 to 425 acres.

Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsurface layer to a depth of 18 inches is very dark gray, firm silty clay loam. The subsoil is multicolored, firm silty clay loam to a depth of about 50 inches. The underlying material to a depth of 60 inches or more is mottled light brownish gray, grayish brown, and yellowish brown, friable sandy clay loam. In some areas, the upper part of the subsoil is darker or the subsoil has more sand. In other areas, this soil has less clay.

Water and air move through the Beaucoup soil at a moderately slow rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 2 feet below. The available water capacity is high. Organic matter content is high. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Beaucoup soil is used mainly for cultivated crops, but it is poorly suited to this use. This soil generally is not suited to use as sites for dwellings or for septic tank absorption fields because of flooding.

In areas of this soil that are used for corn or soybeans, flooding frequently delays planting and occasionally damages the crop. Short-season crops are less likely to be damaged by flooding. This soil is sufficiently drained for cultivated crops. Maintaining or improving the drainage system helps to maintain or improve yields. Tile and surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil improves soil tilth and helps to maintain soil fertility.

This Beaucoup soil is in capability subclass IVw.

71—Darwin silty clay. This soil is nearly level and is poorly drained. It is on flood plains. This soil is protected by a levee system and is subject to only rare flooding. It is ponded for brief periods from March to June. The areas of this soil are irregular in shape and range from 3 to more than 1,500 acres.

Typically, the surface layer is very dark gray, firm silty clay about 12 inches thick. The subsurface layer to a depth of about 21 inches is very dark gray, mottled, firm silty clay. The subsoil to a depth of about 53 inches is mottled, firm silty clay that is dark gray in the upper part and grayish brown in the lower part. The underlying material to a depth of 60 inches or more is mottled dark gray, grayish brown, and yellowish brown, firm silty clay loam. In some areas, this soil has a thicker subsurface layer.

Included with this soil in mapping are areas of Beaucoup soils in slightly higher positions on the flood plain. These soils are moderately slowly permeable. They make up 1 to 5 percent of the map unit.

Water and air move through the Darwin soil at a very slow rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is 1 foot

above the surface to 2 feet below. The available water capacity is moderate. Organic matter content is high. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Darwin soil is used mainly for cultivated crops and is moderately suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding and the very slow permeability.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface ditches and land leveling can reduce the wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain good tilth.

This Darwin soil is in capability subclass IIIw.

74—Radford silt loam, frequently flooded. This soil is nearly level and is somewhat poorly drained. It is on flood plains and is frequently flooded for brief periods from March to June. In a few areas, it is flooded for long periods. The areas of this soil are linear or irregular in shape and range from 5 to 440 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer to a depth of about 12 inches is very dark grayish brown, friable silt loam. The underlying material to a depth of about 33 inches is mottled dark grayish brown and very dark grayish brown, friable silt loam. It has thin grayish brown and brown strata. A buried soil extends to a depth of 60 inches or more. It is very dark gray, friable silt loam that is mottled in the lower part. In some areas, the surface layer is lighter in color, and in others, the depth to the buried soil is more than 40 inches or is less than 20 inches.

Water and air move through the Radford soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is very high. Organic matter content is moderate.

This Radford soil is mainly used for cultivated crops. In some areas, it is used for pasture. This soil is moderately suited to cultivated crops, pasture, and hay. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In areas of this soil used for corn or soybeans, flooding occasionally delays planting or causes crop damage. The seasonal high water table also delays planting in some years. Subsurface drains can lower the water table. Returning crop residue to the soil helps to maintain soil tilth and fertility.

If this soil is used for pasture or hay, harvesting or grazing during wet periods or overgrazing reduces forage production and causes surface compaction and poor soil tilth. Proper stocking, rotation grazing, deferred grazing, and applying fertilizer and lime help to maintain the pasture and the soil.

This Radford soil is in capability subclass IIIw.

78—Arenzville silt loam, frequently flooded. This soil is nearly level and is moderately well drained. It is on flood plains and is frequently flooded for brief periods from March to June. In a few areas, it is flooded for long periods. The areas of this soil are linear or irregular in shape and range from 3 to 340 acres.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The underlying material to a depth of about 27 inches is friable silt loam. The upper part is brown, the next part is stratified dark grayish brown and brown, and the lower part is stratified dark grayish brown, very dark grayish brown, and brown. A buried soil extends to a depth of 60 inches or more. It is very dark gray and is friable. The upper part is silt loam, and the lower part is silty clay loam. In some areas, the surface layer is darker and thicker, and in others, the underlying material is calcareous. In some places, the depth to the buried soil is more than 40 inches, and in a few places, it is within a depth of 20 inches. In some places, a seasonal high water table is within a depth of 3 feet.

Included with this soil in mapping are small areas of Sawmill soils in slightly lower positions on the landscape. These soils are poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Arenzville soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 3 to 6 feet below the surface. The available water capacity is very high. Organic matter content is moderately low.

This soil is used mainly for cultivated crops. In some areas, it is used as pastureland or woodland. This soil is well suited to cultivated crops, pasture, and hay. It is moderately well suited to woodland. This soil generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In areas of this soil used for corn or soybeans, flooding occasionally delays planting and can cause crop damage. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and improve soil fertility.

If this soil is used for pasture or hay, harvesting or grazing during wet periods or overgrazing reduces forage production and causes surface compaction and poor soil tilth. Proper stocking, rotation grazing, deferred grazing, and applying fertilizer and lime help to maintain the pasture and the soil.

Plant competition is a concern in managing this soil for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Arenzville soil is in capability subclass IIw.

81—Littleton silt loam. This soil is nearly level and is somewhat poorly drained. It is on alluvial fans and stream terraces. This soil is subject to rare flooding. The areas of this soil are irregular in shape and range from 3 to 495 acres.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer to a depth of about 36 inches is friable silt loam. The upper part is black, and the lower part is very dark grayish brown and is mottled. The subsoil to a depth of 60 inches or more is mottled dark grayish brown and dark brown, friable silt loam. In some areas, the subsurface layer is thinner, and in others, the subsoil has more clay. In some places, a seasonal high water table is more than 3 feet below the surface.

Included with this soil in mapping are small areas of Worthen soils in slightly higher positions on the landscape. They make up 1 to 5 percent of the map unit.

Water and air move through the Littleton soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is very high. Organic matter content is moderate.

This soil is used mainly for cultivated crops and is well suited to this use. It generally is not suited to use as sites for dwellings because of rare flooding. It is poorly suited to use as sites for septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grains. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. Conservation tillage helps to maintain tilth and fertility.

The seasonal high water table and the moderate permeability limit the use of this soil as sites for septic tank absorption fields. Subsurface tile drains can lower the water table. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome problems caused by the moderate permeability.

This Littleton soil is in capability class I.

87B—Dickinson fine sandy loam, 1 to 5 percent slopes. This soil is gently sloping and is well drained. It is on stream terraces. The areas of this soil are irregular in shape and range from 3 to 195 acres.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 12 inches thick. The subsurface layer to a depth of about 20 inches is dark brown, friable fine sandy loam. The subsoil extends to a depth of about 48 inches. The upper part is brown, friable sandy loam; the next part is dark yellowish brown, friable fine sandy loam; and the lower part is brown, very friable loamy sand. The underlying material to a depth of 60 inches or more is dark yellowish brown and yellowish brown, loose sand. In some areas, the subsoil has more clay. In some areas, a seasonal high water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the Gilford, Hoopeston, and Sparta soils. Gilford and Hoopeston soils are in lower positions than those of the Dickinson soil. Gilford soils are very poorly drained, and Hoopeston soils are somewhat poorly drained. Sparta soils are in slightly higher positions and are excessively drained. The included soils make up 1 to 10 percent of the map unit.

Water and air move through the upper part of the Dickinson soil at a moderately rapid rate and through the lower part at a rapid rate. In cultivated areas, surface runoff is medium. The available water capacity is moderate. Organic matter content is moderately low.

This Dickinson soil is used for cultivated crops. It is well suited to cultivated crops and to use as sites for dwellings. This soil is poorly suited to use as sites for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, water erosion and soil blowing are hazards. Also, the moderate available water capacity and the level of fertility are limitations. Erosion can be controlled and moisture conserved by using conservation tillage, contour farming, or terracing. Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.

If this soil is used as sites for septic tank absorption fields, ground water contamination is a hazard. A septic

system can function satisfactorily if a sealed sand filter and a disinfection tank or evapotranspiration bed are installed.

This Dickinson soil is in capability subclass IIe.

88B—Sparta loamy sand, 1 to 7 percent slopes. This soil is gently sloping and is excessively drained. It is on stream terraces. The areas of this soil are irregular in shape and range from 3 to 525 acres.

Typically, the surface layer is very dark grayish brown, very friable loamy sand about 10 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown, very friable loamy sand. The subsoil extends to a depth of about 39 inches. It is very friable. The upper part of the subsoil is brown loamy sand, the next part is dark yellowish brown loamy sand, and the lower part is yellowish brown sand. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand. In some areas, this soil does not have a subsurface layer and has a surface layer that is lighter in color.

Included with this soil in mapping are small areas of the Dickinson, Gilford, Orio, and Watseka soils. Dickinson soils are in slightly lower positions than those of the Sparta soil and are well drained. Gilford and Watseka soils are in flatter areas. Gilford soils are very poorly drained, and Watseka soils are somewhat poorly drained. Orio soils are in shallow depressions and are poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Sparta soil at a rapid rate. In cultivated areas, surface runoff is slow. The available water capacity is low. Organic matter content is moderately low.

This Sparta soil is used mainly for cultivated crops, but it is poorly suited to this use. It is well suited to use as sites for dwellings and poorly suited to use as sites for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, soil blowing is a hazard and the low available water capacity and low fertility level are limitations. Conservation tillage helps to control soil blowing and to conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and improve soil fertility.

If this soil is used as sites for septic tank absorption fields, ground water contamination is a hazard. A septic system can function satisfactorily if a sealed sand filter and a disinfection tank or evapotranspiration bed are installed.

This Sparta soil is in capability subclass IVs.

107—Sawmill silty clay loam, frequently flooded. This soil is nearly level and is poorly drained. It is on flood plains and is flooded for long periods from March to June. In a few places, it is flooded for only brief periods. The areas of this soil are linear or irregular in shape and range from 3 to 930 acres.

Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsurface layer to a depth of about 29 inches is friable silty clay loam that is very dark gray and black in the upper part and very dark gray in the lower part. The subsoil extends to a depth of about 52 inches. It is mottled, friable silty clay loam that is dark gray and very dark gray in the upper part and dark gray in the lower part. The underlying material to a depth of 60 inches or more is mottled gray and dark gray, friable silty clay loam. In some areas, the subsurface layer is thinner, and in others, the soil has more sand. In some places, a seasonal high water table is at a depth of more than 2 feet.

Included with this soil in mapping are small areas of Arenzville soils in slightly higher positions on the landscape. These soils are moderately well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Sawmill soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is within a depth of 2 feet. The available water capacity is high. Organic matter content is high. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Sawmill soil is used mainly for cultivated crops, but it is poorly suited to this use. This soil generally is not suited to use as sites for dwellings or septic tank absorption fields because of the flooding.

In the areas of this soil that are used for corn or soybeans, flooding frequently delays planting and occasionally damages the crop. Short-season crops are less likely to be damaged by flooding. This soil is sufficiently drained for cultivated crops. Maintaining or improving the drainage system helps to maintain or improve yields. Tile drains and surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil improves soil tilth and helps to maintain soil fertility.

This Sawmill soil is in capability subclass IVw.

131B—Alvin fine sandy loam, 2 to 5 percent slopes. This soil is gently sloping and is well drained. It is on stream terraces and uplands. The areas of this soil are irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is dark brown, friable fine sandy loam about 11 inches thick. The subsoil extends

to a depth of about 53 inches. In sequence downward, it is dark yellowish brown, friable loam; dark yellowish brown, friable fine sandy loam; dark yellowish brown and yellowish brown, friable fine sandy loam; and yellowish brown, very friable very fine sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, very friable very fine sandy loam. In some areas, this soil has less sand, and in others, it has less clay. In some places, a seasonal high water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the Bloomfield, Orio, and Plainfield soils. Bloomfield and Plainfield soils are in positions similar to those of the Alvin soil and have a higher content of sand throughout. Bloomfield soils are somewhat excessively drained, and Plainfield soils are excessively drained. Orio soils are in shallow depressions and are poorly drained. The included soils make up 2 to 15 percent of the map unit.

Water and air move through the upper part of the Alvin soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas, surface runoff is medium. The available water capacity is high. Organic matter content is low.

This Alvin soil is used mainly for cultivated crops. In some areas, it is used as pastureland or woodland. This soil is well suited to cultivated crops, pasture, and hay. It is moderately well suited to woodland. This soil is well suited to use as sites for dwellings and septic tank absorption fields.

In the areas of this soil that are used for corn, soybeans, or small grains, water erosion and soil blowing are hazards. Water erosion can be controlled by using conservation tillage, contour farming, or terracing. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and fertility. Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to control erosion and to maintain the pasture and the soil.

Plant competition is a concern in managing this soil for timber production. The competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Alvin soil is in capability subclass IIe.

131C2—Alvin fine sandy loam, 5 to 10 percent slopes, eroded. This soil is sloping and is well drained. It is on stream terraces and uplands. The areas of this soil are linear or irregular in shape and range from 3 to 65 acres.

Typically, the surface layer is dark brown, friable fine sandy loam about 10 inches thick. It has some mixing of dark yellowish brown subsoil material. The subsoil extends to a depth of 60 inches or more. In sequence downward, it is dark yellowish brown, friable fine sandy loam; dark yellowish brown, friable loam; dark yellowish brown, friable sandy loam; yellowish brown, friable sandy loam; yellowish brown, very friable fine sandy loam; and dark yellowish brown and yellowish brown, very friable fine sandy loam. In some areas, this soil has less clay throughout, and in others, it has less sand.

Included with this soil in mapping are small areas of the Bloomfield, Orio, and Plainfield soils. Bloomfield and Plainfield soils are in positions similar to those of the Alvin soil and have a higher content of sand throughout. Bloomfield soils are somewhat excessively drained, and Plainfield soils are excessively drained. Orio soils are in shallow depressions and are poorly drained. The included soils make up 2 to 15 percent of the map unit.

Water and air move through the upper part of the Alvin soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas, surface runoff is medium. The available water capacity is high. Organic matter content is low.

This Alvin soil is used mainly for cultivated crops. In some areas, it is used as pastureland or woodland. This soil is moderately suited to cultivated crops, pasture, and hay. It is moderately well suited to woodland. This soil is well suited to use as sites for dwellings and septic tank absorption fields.

Control of water erosion is needed in areas of this soil that are used for corn, soybeans, or small grains. Such practices as conservation tillage, contour farming, terracing, and crop rotations can control erosion. At least 1 year of forage crops should be included in the crop rotation. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain soil tilth.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent

overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to water erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

Plant competition is a concern in managing this soil for timber production. The competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Alvin soil is in capability subclass IIIe.

131D—Alvin fine sandy loam, 10 to 15 percent slopes. This soil is strongly sloping and is well drained. It is on uplands. The areas of this soil are linear or irregular in shape and range from 3 to 30 acres.

Typically, the surface layer is dark brown, friable fine sandy loam about 6 inches thick. The subsurface layer to a depth of about 13 inches is brown, friable fine sandy loam. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable fine sandy loam; and the lower part is yellowish brown, very friable, stratified fine sandy loam and loamy fine sand. In some areas, this soil has less clay throughout, and in others, it has less sand. In some places, this soil has slope of more than 15 percent.

Included with this soil in mapping are small areas of Bloomfield and Plainfield soils. These soils are in positions similar to those of the Alvin soil, and they have a higher content of sand throughout. Bloomfield soils are somewhat excessively drained, and Plainfield soils are excessively drained. The included soils make up 2 to 15 percent of the map unit.

Water and air move through the upper part of the Alvin soil at a moderate rate and through the lower part at a moderately rapid rate. Surface runoff is medium. The available water capacity is high. Organic matter content is low.

This Alvin soil is used mainly as woodland or pastureland. This soil is moderately suited to cultivated crops, pasture, and hay, and it is moderately well suited to woodland. This soil is moderately suited to use as sites for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, water erosion is a hazard. Such practices as crop rotations, contour farming, conservation tillage, and stripcropping help to control water erosion. Forage crops should dominate the crop rotation. Returning crop residue to the soil and regularly adding other organic material help to maintain soil tilth and productivity.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to water erosion. Contour tillage and a no-till system of seeding to prepare a seedbed or to renovate the pasture helps to control water erosion. Using a nurse crop, such as rye, and applying fertilizer help to establish and to maintain the pasture. The plants should not be grazed or clipped until they are sufficiently established.

Plant competition is a concern in managing this soil for timber production. The competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

Steepness of slope limits the use of this soil as sites for dwellings or septic tank absorption fields. Alteration of the slope by cutting, filling, and land shaping helps to overcome this limitation on sites for dwellings. Filter lines should be installed on the contour to overcome the slope on sites for septic tank absorption fields.

This Alvin soil is in capability subclass IIIe.

172—Hoopeston sandy loam. This soil is nearly level and is somewhat poorly drained. It is on stream terraces. The areas of this soil are irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is very dark grayish brown, friable sandy loam about 8 inches thick. The subsurface layer to a depth of about 13 inches is very dark grayish brown, friable sandy loam. The subsoil to a depth of about 41 inches is mottled. The upper part is dark brown, very friable sandy loam; the next part is brown, friable sandy loam; and the lower part is yellowish brown and pale brown, loose loamy sand. The underlying material to a depth of 60 inches or more is mottled pale brown and yellowish brown, loose sand that has bands of loamy sand. In some areas, this soil has more clay throughout, and in others, it has less clay.

Included with this soil in mapping are small areas of Gilford soils in lower positions on the landscape. These

soils are very poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the upper part of the Hoopeston soil at a moderately rapid rate and through the lower part at a rapid rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is moderate. Organic matter content is moderate.

This Hoopeston soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grains, soil blowing is a hazard and the moderate available water capacity is a limitation. Conservation tillage helps to control soil blowing and to conserve moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and fertility.

The seasonal high water table is a limitation to the use of this soil as sites for dwellings. Subsurface tile drains near the foundation help to overcome this limitation.

If this soil is used as sites for septic tank absorption fields, ground water contamination is a hazard. A septic system can function satisfactorily if a sealed sand filter and a disinfection tank or evapotranspiration bed are installed.

This Hoopeston soil is in capability subclass IIs.

188A—Beardstown loam, 0 to 3 percent slopes. This soil is nearly level and is somewhat poorly drained. It is on stream terraces. The areas of this soil are irregular in shape and range from 3 to 105 acres.

Typically, the surface layer is very dark grayish brown, friable loam about 9 inches thick. The subsurface layer to a depth of about 14 inches is dark grayish brown, friable loam. The subsoil to a depth of about 48 inches is mottled. In sequence downward, it is brown, friable loam; grayish brown, friable clay loam; brown and grayish brown, friable, stratified loam and sandy loam; and brown and dark yellowish brown, very friable, stratified loamy sand and sandy loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, very friable, stratified loamy sand and sandy loam. In some areas, the surface layer is thicker, and in others, the subsoil has less clay. In some areas, a seasonal high water table is within a depth of 1 foot, and in others, it is at a depth of more than 3 feet.

Included with this soil in mapping are small areas of the sandy Sparta and Watseka soils. Sparta soils are in higher positions than those of the Beardstown soil and are excessively drained. Watseka soils are in positions similar to those of the Beardstown soil. The included soils make up 1 to 5 percent of the map unit.

Water and air move through the upper part of the Beardstown soil at a moderate or moderately slow rate and through the lower part at a moderately rapid rate. In cultivated areas, surface runoff is slow. In spring, the seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is high. Organic matter content is moderate.

This Beardstown soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water intake.

The seasonal high water table limits the use of this soil as sites for dwellings. Subsurface tile drains near the foundation help to overcome this limitation.

The moderate and moderately slow permeability and the seasonal high water table limit the use of this soil as sites for septic tank absorption fields. Tile drains can lower the water table, and enlarging the absorption field helps to overcome the permeability limitation. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

This Beardstown soil is in capability subclass IIw.

200—Orio loam. This soil is nearly level and is poorly drained. It is in shallow depressions on stream terraces and is on uplands. This soil is occasionally ponded for brief periods from March to June. The areas of this soil are irregular in shape and range from 3 to 185 acres.

Typically, the surface layer is very dark gray, friable loam about 9 inches thick. The subsurface layer to a depth of 22 inches is mottled and friable. The upper part is grayish brown loamy sand, and the lower part is light brownish gray and grayish brown sandy loam. The subsoil extends to a depth of about 45 inches. It is gray and light gray, mottled, firm sandy clay loam. The lower

part of the subsoil has light brownish gray bands of loamy sand. The underlying material to a depth of 60 inches or more is dark gray, mottled, friable, stratified sandy loam and loam that has light brownish gray bands of loamy sand. In some areas, this soil has less clay throughout, and in others, the surface layer is thicker. In some places, the subsoil has less sand. In some areas, a seasonal high water table is more than 1 foot below the surface.

Included with this soil in mapping are small areas of soils in positions similar to those of the Orio soil that have not been drained and remain wet during the early part of the growing season. They make up 1 to 5 percent of the map unit.

Water and air move through the Orio soil at a moderate or moderately slow rate. In cultivated areas, surface runoff is very slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 1 foot below. The available water capacity is high. Organic matter content is moderately low.

This Orio soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water intake.

If this soil is used as sites for dwellings, ponding is a hazard. This hazard can be reduced by diverting surface water from the site or by constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains can lower the water table.

Ponding, the seasonal high water table, and the moderate and moderately slow permeability limit the use of this soil as sites for septic tank absorption fields. Subsurface tile drains can lower the water table, and land shaping by cutting and filling removes excess surface water. The depth to the seasonal high water table can be increased by adding as much as 2 feet of loamy fill material on the surface. This also helps to overcome the permeability limitation.

This Orio soil is in capability subclass IIw.

201—Gilford sandy loam. This soil is nearly level and is very poorly drained. It is on stream terraces. This soil is occasionally ponded for brief periods from March to May. The areas of this soil are irregular in shape and range from 3 to 245 acres.

Typically, the surface layer is black, friable sandy loam about 10 inches thick. The subsurface layer to a depth of about 18 inches is very dark grayish brown, mottled, friable sandy loam. The subsoil to a depth of about 31 inches is mottled sandy loam. The upper part is grayish brown and is friable. The lower part is gray and dark gray and is very friable. The underlying material is mottled and very friable. The upper part is dark gray loamy sand. The lower part to a depth of 60 inches or more is light brownish gray and grayish brown, stratified loamy sand and sand. In some areas, the subsurface layer is thicker, and in others, the subsoil has more clay. In some places, the subsoil has less clay.

Included with this soil in mapping are small areas of the Hoopeston, Watseka, and Sparta soils in higher positions on the landscape. Hoopeston and Watseka soils are somewhat poorly drained, and Watseka soils are excessively drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the upper part of the Gilford soil at a moderately rapid rate and through the lower part at a rapid rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 1 foot below. The available water capacity is high. Organic matter content is moderate.

This Gilford soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction, and increase the rate of water intake.

If this soil is used as sites for dwellings, ponding is a hazard. This hazard can be reduced by diverting surface water from the site or by constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains can lower the water table.

If this soil is used as sites for septic tank absorption fields, the seasonal high water table is a limitation and ground water contamination is a hazard. Underground drains can lower the water table. A septic system can function satisfactorily if a sealed sand filter and a

disinfection tank or an evapotranspiration bed are installed.

This Gilford soil is in capability subclass IIw.

206—Thorp silt loam. This soil is nearly level and is poorly drained. It is in shallow depressions on stream terraces. This soil is occasionally ponded from March to June. The areas of this soil are irregular in shape and range from 3 to 40 acres.

Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsurface layer to a depth of about 19 inches is mottled light brownish gray and grayish brown, friable silt loam. The subsoil extends to a depth of 60 inches or more and is mottled. In sequence downward, it is dark grayish brown, friable silty clay loam; dark gray and gray, firm silty clay loam; grayish brown and light brownish gray, firm silty clay loam; and light brownish gray, friable loam. In some areas, the surface layer is thinner, and in others, the subsoil has more clay. In some places, this soil has more sand in the upper part of the profile.

Water and air move through the Thorp soil at a slow rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 2 feet below. The available water capacity is high. Organic matter content is high.

This Thorp soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water intake.

If this soil is used as sites for dwellings, ponding is a hazard. This hazard can be reduced by diverting surface water from the site or by constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains can lower the water table.

Ponding and the seasonal high water table limit the use of this soil as sites for septic tank absorption fields. The depth to the seasonal high water table can be increased by adding as much as 2 feet of loamy fill material on the surface. A septic system can function satisfactorily if a sealed sand filter and disinfection tank or evapotranspiration bed are installed.

This Thorp soil is in capability subclass IIw.

244—Hartsburg silty clay loam. This soil is nearly level and is poorly drained. It is on broad upland flats. This soil is occasionally ponded for brief periods from March to June. The areas of this soil are irregular in shape and range from 3 to 5,280 acres.

Typically, the surface layer is black, friable silty clay loam about 6 inches thick. The subsurface layer to a depth of 13 inches is black, friable silty clay loam. The subsoil to a depth of about 40 inches is mottled and friable. In sequence downward, it is very dark gray silty clay loam; dark grayish brown, calcareous silty clay loam; dark grayish brown, olive brown, and strong brown, calcareous silty clay loam; grayish brown, calcareous silty clay loam; and grayish brown, calcareous silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable, calcareous silt loam. In some areas, the depth to free carbonates is more than 35 inches. In some areas, a seasonal high water table is more than 2 feet below the surface.

Included with this soil in mapping are small areas of Tama soils on slight rises. These soils are moderately well drained and well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Hartsburg soil at a moderate rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 2 feet below. The available water capacity is very high. Organic matter content is high. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Hartsburg soil is used mainly for cultivated crops and is well suited to this use. It is poorly suited to use as sites for dwellings and septic tank absorption fields.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction, and increase the rate of water intake.

If this soil is used as sites for dwellings, ponding is a hazard. This hazard can be reduced by diverting surface water from the site or by constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains can lower the water table.

Ponding and the seasonal high water table limit the use of this soil as sites for septic tank absorption fields. The depth to the seasonal high water table can be

increased by adding as much as 2 feet of loamy fill material on the surface. Subsurface tile drains can lower the water table. A septic system can function satisfactorily if a sealed sand filter and disinfection tank or evapotranspiration bed are installed.

This Hartsburg soil is in capability subclass IIw.

279A—Rozetta silt loam, 0 to 2 percent slopes. This soil is nearly level and is moderately well drained. It is on upland flats and ridges. The areas of this soil are irregular in shape and range from 3 to 170 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer to a depth of about 15 inches is dark brown, friable silt loam. The subsoil extends to a depth of about 50 inches. The upper part is dark yellowish brown, firm silty clay loam; the next part is yellowish brown, firm silty clay loam; and the lower part is yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches or more is mottled brown, light brownish gray, and strong brown, friable silt loam. In some areas, the surface layer is darker, and in others, the subsoil has more clay. In some areas, a seasonal high water table is not within a depth of 6 feet, and in others, a seasonal high water table is within a depth of 4 feet.

Water and air move through the Rozetta soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 4 to 6 feet below the surface. The available water capacity is very high. Organic matter content is moderately low. In cultivated areas, the surface layer tends to crust after hard rains. Shrink-swell potential is moderate.

This Rozetta soil is used mainly for cultivated crops. In some areas, it is used as pastureland or woodland. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is moderately suited to use as sites for dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grains. Conservation tillage improves soil tilth and helps to maintain soil productivity.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa. Overgrazing reduces forage production and causes surface compaction and poor tilth. Proper stocking, rotation grazing, deferred grazing, and applying fertilizer and lime help to maintain the pasture and the soil.

Plant competition is a concern in managing this soil for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

The moderate shrink-swell potential limits the use of this soil as sites for dwellings. The seasonal high water table is a limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling. Subsurface tile drains near the foundation can lower the water table on sites for dwellings with basements.

The seasonal high water table and the moderate permeability are limitations if this soil is used as sites for septic tank absorption fields. Subsurface tile drains can lower the water table. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

This Rozetta soil is in capability class I.

279B—Rozetta silt loam, 2 to 5 percent slopes. This soil is gently sloping and is moderately well drained. It is on ridgetops and side slopes of uplands. The areas of this soil are linear or irregular in shape and range from 3 to 130 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer to a depth of about 14 inches is brown, friable silt loam. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable silty clay loam; the next part is yellowish brown, mottled, firm silty clay loam; and the lower part is yellowish brown, mottled, friable silt loam. In some areas, the surface layer is darker, and in others, the subsoil has more clay. In some places, this soil has slope of less than 2 percent or more than 5 percent. In a few areas, this soil does not have a seasonal high water table within a depth of 6 feet. In a few places, it is within a depth of 4 feet.

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

This Rozetta soil is used mainly for cultivated crops. In some areas, it is used as pastureland or woodland. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is moderately suited to use as sites for

dwellings and septic tank absorption fields.

In the areas of this soil that are used for corn, soybeans, or small grains, water erosion is a hazard. Erosion can be controlled, however, by such practices as conservation tillage, contour farming, or terracing. Returning crop residue to the soil or regularly adding other organic material improves soil tilth and helps to maintain soil fertility.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to control erosion and to maintain the pasture and the soil.

Plant competition is a concern in managing this soil for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

The moderate shrink-swell potential limits the use of this soil as sites for dwellings. The seasonal high water table is a limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling. Subsurface tile drains near the foundation can lower the water table on sites for dwellings with basements.

The seasonal high water table and the moderate permeability are limitations if this soil is used as sites for septic tank absorption fields. Subsurface tile drains can lower the water table. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

This Rozetta soil is in capability subclass IIe.

280B—Fayette silt loam, 2 to 5 percent slopes. This soil is gently sloping and is well drained. It is on ridgetops and side slopes of uplands. The areas of this soil are linear or irregular in shape and range from 3 to 130 acres.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsurface layer to a depth of 12 inches is dark yellowish brown, friable silt loam. The subsoil extends to a depth of 60 inches or more. In sequence downward, it is dark yellowish brown, friable silt loam; dark yellowish brown, firm silty clay loam; yellowish brown, firm silty clay loam; and yellowish brown, firm silt loam. In some areas, the surface layer is darker, and in others, the subsoil has more clay. In some places, this soil has a seasonal high water table within a depth of 6 feet.

Included with this soil in mapping are small areas of Keomah soils on the less sloping parts of the landscape. These soils are somewhat poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Fayette soil at a moderate rate. In cultivated areas, surface runoff is medium. The available water capacity is very high. Organic matter content is moderately low. In cultivated areas, the surface layer tends to crust after hard rains. Shrink-swell potential is moderate.

This Fayette soil is used for cultivated crops. In some areas, it is used as pastureland or woodland. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is moderately suited to use as sites for dwellings and septic tank absorption fields.

In areas of this soil that are used for corn, soybeans, or small grains, erosion is a hazard. Erosion can be controlled, however, by such practices as conservation tillage, contour farming, or terracing. Returning crop residue to the soil or regularly adding other organic material improves soil tilth and helps to maintain soil fertility.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to control erosion and to maintain the pasture and the soil.

Plant competition is a concern in managing this soil for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

The moderate shrink-swell potential limits the use of this soil as sites for dwellings. Reinforcing the foundation helps to prevent structural damage caused by shrinking and swelling.

The moderate permeability limits the use of this soil as sites for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

This Fayette soil is in capability subclass IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This soil is sloping and is well drained. It is on ridges and side slopes of uplands. The areas of this soil are linear or irregular in shape and range from 3 to 40 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 4 inches thick. Part of the original surface layer has been removed by erosion, and the remaining layer has some mixing of dark yellowish brown subsoil material. The subsoil to a depth of about 44 inches is friable. The upper part is dark yellowish brown silty clay loam, the next part is dark yellowish brown silt loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable, calcareous silt loam. In some of the more eroded areas, the surface layer is silty clay loam. In other areas, this soil is calcareous within a depth of 40 inches.

Included with this soil in mapping are small areas of the Arenzville and Bold soils. Arenzville soils are in drainageways and are moderately well drained. Bold soils are on side slopes at a lower elevation than the Fayette soil and are calcareous. The included soils make up 1 to 5 percent of the map unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium. The available water capacity is very high. Organic matter content is moderately low. In cultivated areas, the surface layer tends to crust after hard rains. Shrink-swell potential is moderate.

This Fayette soil is used mainly as pastureland or woodland. In some areas, it is used for cultivated crops. This soil is moderately suited to cultivated crops and well suited to pasture, hay, and woodland. It is moderately suited to use as sites for dwellings and septic tank absorption fields.

Erosion control is needed in the areas of this soil that are used for corn, soybeans, or small grains. Such practices as conservation tillage, contour farming, terracing, and crop rotation help to control erosion. At least 1 year of forage crops should be included in the crop rotation. Tilling when the soil is wet causes surface cloddiness, soil compaction, and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve soil tilth.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture also helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

Plant competition is a concern in managing this soil for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

The moderate shrink-swell potential limits the use of this soil as sites for dwellings. Reinforcing the foundation helps to prevent structural damage caused by shrinking and swelling.

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

This Fayette soil is in capability subclass IIIe.

280D2—Fayette silt loam, 10 to 15 percent slopes, eroded. This soil is strongly sloping and is well drained. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 55 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 3 inches thick. Part of the original surface layer has been removed by water erosion. The subsurface layer to a depth of about 7 inches is dark brown, friable silt loam. The subsoil to a depth of 60 inches or more is friable. In sequence downward, it is mixed dark brown and dark yellowish brown silt loam; dark yellowish brown silt loam; dark yellowish brown silty clay loam; and yellowish brown silt loam. In some areas, this soil has more sand throughout the profile, and in others, it is calcareous within a depth of 40 inches.

Included with this soil in mapping are small areas of Arenzville and Bold soils. Arenzville soils are in drainageways and are moderately well drained. Bold soils are on side slopes at a lower elevation than the Fayette soil and are calcareous. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low. Shrink-swell potential is moderate.

This Fayette soil is used mainly as woodland or pastureland. It is poorly suited to cultivated crops and is

well suited to pasture, hay, and woodland. This soil is moderately suited to use as sites for dwellings and septic tank absorption fields.

Further erosion is a hazard if this soil is used for corn, soybeans, or small grains. Also, tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation dominated by forage crops and by a combination of contour farming and conservation tillage. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil productivity, to prevent crusting, and to improve soil tilth.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture also helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

Plant competition is a concern in managing this soil for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

Steepness of slope and the shrink-swell potential limit the use of this soil as sites for dwellings. Land shaping by cutting and filling helps to overcome the problems caused by the slope. Extending foundation footings below the subsoil and reinforcing the foundation help to prevent structural damage caused by shrinking and swelling.

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

This Fayette soil is in capability subclass IIIe.

280E—Fayette silt loam, 15 to 30 percent slopes. This soil is steep and is well drained. It is on side slopes of uplands. The areas of this soil are linear and range from 3 to 145 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer to a depth of about 12 inches is friable silt loam that is dark grayish brown in the upper part and dark yellowish brown in the lower part. The subsoil to a depth of about 56 inches is friable. The upper part is dark yellowish brown silty clay loam, the next part is dark yellowish brown and yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam. In some areas, this soil has less clay, and in others it has more sand. In some places, this soil is calcareous within a depth of 40 inches.

Included with this soil in mapping are small areas of Arenzville and Bold soils. Arenzville soils are in drainageways and are moderately well drained. Bold soils are on side slopes at a lower elevation than the Fayette soil and are calcareous. The included soils make up 5 to 10 percent of the map unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

This Fayette soil is used mainly as woodland or pastureland. It is moderately suited to pasture and hay and moderately well suited to woodland. Because of the steepness of slope, this soil generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a no-till seeding system improves forage quality and helps to control water erosion. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain pasture.

Because of the steepness of slope, the water erosion hazard and the equipment use limitation are concerns in managing this soil for timber production. Plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome the problems caused by the slope and helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding bare areas to grass or to a grass-legume mixture after completion of logging operations helps to control erosion. Competition

of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Fayette soil is in capability subclass VIe.

284—Tice silty clay loam, frequently flooded. This soil is nearly level and is somewhat poorly drained. It is on flood plains and is frequently flooded for long periods from March to June. In a few areas, it is flooded for only brief periods. The areas of this soil are irregular in shape and range from 3 to 260 acres.

Typically, the surface layer is very dark gray, firm silty clay loam about 9 inches thick. The subsurface layer to a depth of about 19 inches is firm silty clay loam that is very dark gray in the upper part and very dark grayish brown and mottled in the lower part. The subsoil to a depth of 60 inches or more is mottled silty clay loam. In sequence downward, it is dark grayish brown and brown and friable; grayish brown and brown and friable; grayish brown and firm; light brownish gray and firm. In some areas, the upper part of the subsoil is darker. In some places, this soil has less clay throughout the profile and in others, it has more sand. In some areas, a seasonal high water table is within a depth of 1 foot.

Water and air move through the Tice soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is high. Organic matter content is moderate. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Tice soil is used mainly for cultivated crops and is moderately suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In the areas of this soil that are used for corn or soybeans, flooding frequently delays planting and occasionally damages the crop. Short-season crops are less likely to be damaged by flooding. This soil is sufficiently drained for cultivated crops. Maintaining or improving the drainage system helps to maintain or improve yields. Tile and surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil improves soil tilth and helps to maintain soil fertility.

This Tice soil is in capability subclass IVw.

302—Ambraw clay loam, frequently flooded. This soil is nearly level and is poorly drained. It is on flood plains and is frequently flooded for long periods from March to June. In a few areas, it is flooded for only brief periods. The areas of this soil are irregular in shape and range from 3 to 320 acres.

Typically, the surface layer is black, firm clay loam about 13 inches thick. The subsurface layer to a depth of about 17 inches is very dark gray, friable clay loam. The subsoil to a depth of about 44 inches is mottled and friable. The upper part is dark grayish brown clay loam, the next part is dark grayish brown and grayish brown clay loam, and the lower part is grayish brown and dark grayish brown loam. The underlying material to a depth of 60 inches or more is mottled, dark gray and grayish brown, very friable, stratified loamy sand and sand. In some areas, the upper part of the subsoil is darker. In some places, this soil has less sand throughout the profile, and in others, it has less clay throughout.

Included with this soil in mapping are small areas of Medway soils in higher positions on the landscape. These soils are moderately well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Ambraw soil at a moderately slow rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is within a depth of 2 feet. The available water capacity is high. Organic matter content is moderate.

This Ambraw soil is used mainly for cultivated crops, but it is poorly suited to this use. This soil generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In areas of this soil that are used for corn or soybeans, flooding frequently delays planting and occasionally damages the crop. Short-season crops are less likely to be damaged by flooding. This soil is sufficiently drained for cultivated crops. Maintaining or improving the drainage system helps to maintain or improve yields. Tile and surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil improves soil tilth and helps to maintain soil fertility.

This Ambraw soil is in capability subclass IVw.

304A—Landes fine sandy loam, frequently flooded, 0 to 3 percent slopes. This soil is nearly level and is well drained. It is on flood plains. This soil is frequently flooded for brief periods from March to May. The areas of this soil are irregular in shape and range from 3 to 280 acres.

Typically, the surface layer is very dark grayish

brown, friable fine sandy loam about 14 inches thick. The subsoil extends to a depth of about 36 inches. In sequence downward, it is dark brown, friable loam; brown, friable loam; brown, friable fine sandy loam; brown and dark yellowish brown, very friable fine sandy loam; and dark yellowish brown and brown, very friable loamy sand. The underlying material to a depth of 60 inches is yellowish brown, loose sand. In some areas, the upper part of the subsoil is darker. In some places, this soil has more clay throughout the profile, and in others, it has less sand throughout.

Included with this soil in mapping are small areas of the Ambraw and Sparta soils. Ambraw soils are in lower positions than those of the Landes soil and are poorly drained. Sparta soils are in higher positions and are excessively drained. The included soils make up 1 to 10 percent of the map unit.

Water and air move through the upper part of the Landes soil at a moderately rapid rate and through the lower part at a rapid rate. In cultivated areas, surface runoff is slow. The available water capacity is moderate. Organic matter content is moderately low.

This Landes soil is used mainly for cultivated crops and is moderately suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In areas of this soil that are used for corn or soybeans, flooding frequently delays planting and can cause crop damage. Short-season crops and varieties are less likely to be damaged by flooding. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and improve soil fertility.

This Landes soil is in capability subclass IIIw.

430B—Raddle silt loam, 2 to 5 percent slopes. This soil is gently sloping and is well drained. It is on alluvial fans, foot slopes, and stream terraces. The areas of this soil are irregular in shape and range from 3 to 275 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer to a depth of about 16 inches is dark brown, friable silt loam. The subsoil to a depth of 60 inches or more is friable silt loam. The upper part is dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown and dark yellowish brown. In some areas, the upper part of the subsoil is darker, and in others, the lower part of the profile is calcareous. A seasonal high water table is within a depth of 6 feet in some areas.

Included with this soil in mapping are small areas of Littleton soils in lower positions on the landscape. These soils are somewhat poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Raddle soil at a moderate rate. In cultivated areas, surface runoff is medium. The available water capacity is very high. Organic matter content is moderate.

This Raddle soil is used mainly for cultivated crops and is well suited to this use. This soil is also well suited to use as sites for dwellings and septic tank absorption fields.

In areas of this soil that are used for corn, soybeans, or small grains, erosion is a hazard. Erosion can be controlled, however, by such practices as conservation tillage, contour farming, or terracing (fig. 8). Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and fertility.

This Raddle soil is in capability subclass IIe.

430C—Raddle silt loam, 5 to 10 percent slopes. This soil is sloping and is well drained. It is on alluvial fans, foot slopes, and stream terraces. The areas of this soil are linear or irregular in shape and range from 3 to 45 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer to a depth of 17 inches is dark brown, friable silt loam. The subsoil to a depth of about 45 inches is friable silt loam that is brown in the upper part and dark yellowish brown in the lower part. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas, the upper part of the subsoil is darker, and in others, the lower part of the profile is calcareous.

Water and air move through the Raddle soil at a moderate rate. In cultivated areas, surface runoff is medium. The available water capacity is very high. Organic matter content is moderate.

This Raddle soil is used mainly for cultivated crops or pasture. It is moderately suited to cultivated crops and is well suited to pasture and hay and to use as sites for dwellings and septic tank absorption fields.

In areas of this soil that are used for corn, soybeans, or small grains, further water erosion is a hazard. Such practices as crop rotation, conservation tillage, and contour farming or terracing help to control erosion and to maintain soil productivity. At least 1 year of close-growing grasses and legumes should be included in the crop rotation. Keeping tillage at a minimum, returning crop residue to the soil, or regularly adding other organic material improves soil tilth and fertility and increases the rate of water intake.

Figure 8.—Leaving crop residue on the surface helps to control erosion and to maintain the tilth and fertility in Raddle silt loam, 2 to 5 percent slopes.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture also helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

This Raddle soil is in capability subclass IIIe.

451—Lawson silt loam, frequently flooded. This soil is nearly level and is somewhat poorly drained. It is on flood plains and is frequently flooded for brief periods from March to June. In a few places, it is flooded for long periods. The areas of this soil are linear or irregular in shape and range from 3 to 235 acres.

Typically, the surface layer is very dark gray, friable silt loam about 9 inches thick. The subsurface layer to a depth of about 27 inches is very dark grayish brown, friable silt loam. The underlying material to a depth of 60 inches or more is mottled, friable silt loam. The upper part is very dark grayish brown, and the lower part is very dark gray. In some areas, this soil has more clay throughout the profile, and in others, it has more sand. In some places, a seasonal high water table is within a depth of 1 foot.

Water and air move through the Lawson soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is very high. Organic matter content is moderate.

This Lawson soil is used mainly for cultivated crops

and is moderately suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In areas of this soil that are used for corn or soybeans, flooding occasionally delays planting or causes crop damage. Also, the seasonal high water table can delay planting in some years. Subsurface drains can lower the water table. Returning crop residue to the soil helps to maintain soil tilth and fertility.

This Lawson soil is in capability subclass IIIw.

567C2—Elkhart silt loam, 5 to 10 percent slopes, eroded. This soil is sloping and is well drained. It is on side slopes of uplands. The areas of this soil are linear or irregular in shape and range from 3 to 65 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. It has some mixing of dark brown subsoil material. The subsoil to a depth of about 34 inches is friable. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches or more is mottled, friable, calcareous silt loam. The upper part is yellowish brown, and the lower part is light brownish gray. In some areas, the surface layer is thinner, and in others, the soil is not calcareous within a depth of 40 inches. In some places, this subsoil has less clay.

Included with this soil in mapping are small areas of the Bold and Radford soils. Bold soils are on side slopes at a lower elevation than the Elkhart soil and are calcareous. Radford soils are in drainageways and are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Elkhart soil at a moderate rate. In cultivated areas, surface runoff is medium. The available water capacity is very high. Organic matter content is moderate.

This Elkhart soil is used mainly for cultivated crops. In some areas, it is used for pasture and hay. This soil is moderately suited to cultivated crops and is well suited to pasture and hay and to use as sites for dwellings and septic tank absorption fields.

Erosion control is needed in areas of this soil that are used for corn, soybeans, or small grains. Such practices as conservation tillage, contour farming, terracing, and crop rotation help to control erosion. At least 1 year of forage crops should be included in the crop rotation. Tilling when the soil is wet causes surface cloddiness, soil compaction, and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve soil tilth.

This soil is suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture also helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

This Elkhart soil is in capability subclass IIIe.

682—Medway loam, frequently flooded. This soil is nearly level and is moderately well drained. It is on flood plains and is frequently flooded for long periods from March to June. In a few places, it is flooded for only brief periods. The areas of this soil are irregular in shape and range from 3 to 150 acres.

Typically, the surface layer is very dark grayish brown, friable loam about 9 inches thick. The subsurface layer to a depth of about 15 inches is dark brown, friable loam. The subsoil to a depth of about 49 inches is mottled and friable. In sequence downward, it is dark brown loam; brown loam; yellowish brown loam; and yellowish brown fine sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, very friable loamy sand. In some areas, the upper part of the subsoil is darker. In some places, this soil has less clay throughout the profile, and in others, it has less sand.

Included with this soil in mapping are small areas of Ambraw soils in lower positions on the landscape. These soils are poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the upper part of the Medway soil at a moderate rate and through the lower part at a moderate or moderately rapid rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1.5 to 3 feet below the surface. The available water capacity is high. Organic matter content is moderate.

This Medway soil is used mainly for cultivated crops and is moderately suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In areas of this soil that are used for corn or soybeans, flooding occasionally delays planting or causes crop damage. Also, the seasonal high water table can delay planting in some years. Subsurface drains can lower the water table. Returning crop residue to the soil helps to maintain soil tilth and fertility.

This Medway soil is in capability subclass IIIw.

776—Comfrey clay loam, frequently flooded. This soil is nearly level and is poorly drained. It is on flood plains and is frequently flooded for long periods from March to June. In a few places, it is flooded for only brief periods. The areas of this soil are linear or irregular in shape and range from 3 to 205 acres.

Typically, the surface layer is black, friable clay loam about 7 inches thick. The subsurface layer to a depth of about 30 inches is friable clay loam. The upper part is black, and the lower part is mottled black and very dark gray. The subsoil to a depth of about 46 inches is mottled clay loam. The upper part is very dark gray and dark grayish brown and is firm. The lower part is dark gray and is friable. The underlying material to a depth of 60 inches or more is mottled, dark grayish brown and grayish brown, friable loam. In some areas, the subsurface layer is thinner. In some places, this soil has less clay throughout the profile, and in others, it has less sand.

Included with this soil in mapping are small areas of Medway soils in higher positions on the landscape. These soils are moderately well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Comfrey soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is within a depth of 3 feet. The available water capacity is high. Organic matter content is high.

This Comfrey soil is used mainly for cultivated crops and is moderately suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of the flooding.

In areas of this soil that are used for corn or soybeans, flooding frequently delays planting and occasionally damages the crop. Short-season crops are less likely to be damaged by flooding. This soil is sufficiently drained for cultivated crops. Maintaining or improving the drainage system helps to maintain or improve yields. Tile and surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil improves soil tilth and helps to maintain soil fertility.

This Comfrey soil is in capability subclass IIIw.

943E—Seaton-Timula silt loams, 15 to 30 percent slopes. These soils are steep and are well drained. They are on side slopes of uplands. Seaton soil has smooth slopes and is at a lower elevation than the Timula soil, which has slightly convex slopes. This map unit is about 50 to 60 percent Seaton soil and 30 to 40 percent Timula soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear and range from 3 to 160 acres.

Typically, the Seaton soil has a dark brown, friable silt loam surface layer about 5 inches thick. The subsurface layer to a depth of about 13 inches is brown, friable silt loam. The subsoil to a depth of at least 60 inches is friable silt loam that is yellowish brown in the upper part and brown in the lower part. In some areas, the subsoil has more clay, and in others, it has more sand.

Typically, the Timula soil has a dark brown, friable silt loam surface layer about 5 inches thick. The subsoil to a depth of about 26 inches is friable silt loam that is mixed dark brown and dark yellowish brown in the upper part and is yellowish brown in the lower part. The underlying material to a depth of 60 inches or more is mottled, friable, calcareous silt loam. The upper part is yellowish brown, and the lower part is light brownish gray and yellowish brown. In some areas, this soil is calcareous throughout, and in others, the subsoil has more clay.

Included with these soils in mapping are small areas of Arenzville and Radford soils in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Seaton and Timula soils at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

These soils are used mainly as pastureland or woodland. These soils are moderately suited to pasture, hay, and woodland. They generally are not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields because of the steepness of slope.

These soils are suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion. The plants should not be grazed or clipped until they are sufficiently established. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help keep the pasture and the soil in good condition.

Because of the steepness of slope, the water erosion hazard, equipment use limitation, and seedling mortality are concerns in managing these soils for timber production. Plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome problems caused by the slope and also helps to control erosion. Skidding logs or trees uphill with a

cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding all bare areas to grass or to a grass-legume mixture after completion of logging operations also helps to control erosion. Use of machinery should be limited to periods when the soil is firm enough to support the equipment. Seedling mortality can be reduced if all vegetation within 2 feet of the existing or planted seedlings is eliminated and if older and larger stock is planted. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

These Seaton and Timula soils are in capability subclass VIe.

943G—Seaton-Timula silt loams, 30 to 60 percent slopes. These soils are very steep and are well drained. They are on side slopes of uplands near streams. The Seaton soil has smooth slopes and is at a lower elevation than the Timula soil, which has slightly convex slopes. This map unit is about 50 to 60 percent Seaton soil and 30 to 40 percent Timula soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear in shape and range from 3 to 255 acres.

Typically, the Seaton soil has a mixed very dark grayish brown and dark grayish brown, friable silt loam surface layer about 3 inches thick. The subsurface layer to a depth of about 6 inches is dark brown, friable silt loam. The subsoil to a depth of 60 inches or more is dark yellowish brown silt loam. The upper part is friable, and the lower part is firm. In some areas, the subsoil has more clay, and in others, it has more sand.

Typically, the Timula soil has a very dark grayish brown, friable silt loam surface layer about 5 inches thick. It has some subsurface layer material. The subsurface layer to a depth of about 9 inches is dark brown, friable silt loam. The subsoil to a depth of about 27 inches is friable silt loam that is dark yellowish brown in the upper part and dark yellowish brown and yellowish brown in the lower part. The substratum to a depth of 60 inches or more is yellowish brown, friable, calcareous silt loam. In some areas, the subsoil has more clay, and in others, the soil is calcareous throughout.

Included with these soils in mapping are small areas of Arenzville and Radford soils in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Seaton and Timula soils at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

These soils are used mainly as woodland. In some areas, they are used for pasture. These soils are poorly suited to pasture and moderately suited to woodland. They generally are not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields because of the very steep slope.

These soils are suited to bromegrass, orchardgrass, tall fescue, and alfalfa; however, water erosion is a major hazard. Because large machinery generally cannot cross the short, very steep slopes, the only methods of seeding, fertilizing, and spraying are by airplane and by hand. Ground cover is essential to control water erosion. Proper stocking, deferred grazing, fertilizing, and rotation grazing help to maintain the pasture and to control erosion.

Because of the very steep slope, the water erosion hazard, equipment use limitation, and seedling mortality are concerns in managing these soils for timber production. Plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome problems caused by the slope and also helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding all bare areas to grass or to a grass-legume mixture after completion of logging operations also helps to control erosion. Use of machinery should be limited to periods when the soil is firm enough to support the equipment. Seedling mortality can be reduced if all vegetation within 2 feet of the existing or planted seedlings is eliminated and if older and larger stock is planted. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

These Seaton and Timula soils are in capability subclass VIIe.

962C3—Sylvan-Bold complex, 5 to 10 percent slopes, severely eroded. These soils are sloping and are well drained. They are on side slopes of uplands.

Over most of the area, the original surface layer has been removed by water erosion and tillage has mixed the rest with the upper part of the subsoil or the underlying material. The Sylvan soil is at a higher elevation than the Bold soil. This map unit is about 55 to 60 percent Sylvan soil and 35 to 40 percent Bold soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear and range from 3 to 115 acres.

Typically, the Sylvan soil has a mixed brown and very dark grayish brown, friable silty clay loam surface layer about 6 inches thick. The subsoil to a depth of about 30 inches is yellowish brown and is friable. The upper part is silty clay loam, the next part is silt loam, and the lower part is silt loam and is mottled. The underlying material to a depth of 60 inches or more is mottled light brownish gray and yellowish brown, friable, calcareous silt loam. In some areas, the subsoil has less clay, and in others, carbonates are at a depth of more than 40 inches.

Typically, the Bold soil has a mixed brown and dark brown, friable silt loam surface layer about 4 inches thick. The underlying material to a depth of 60 inches or more is friable, calcareous silt loam. The upper part is brownish yellow, and the lower part is mottled light brownish gray and yellowish brown. In some areas, this soil has less clay throughout the profile.

Included with these soils in mapping are small areas of Arenzville and Radford soils in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Sylvan and Bold soils at a moderate rate. In cultivated areas, surface runoff is medium. The available water capacity is very high. Organic matter content is low. The surface layer is compact and cloddy if these soils are plowed when too wet.

These soils are used mainly for cultivated crops. In some areas, they are used for pasture and hay. These soils are poorly suited to cultivated crops and moderately suited to pasture and hay. They are well suited to use as sites for dwellings with basements and for septic tank absorption fields.

In areas of these soils that are used for corn, soybeans, or small grains, further water erosion is a severe hazard. Such practices as crop rotation, conservation tillage, and contour farming or terracing help to control erosion and to maintain soil productivity. Crop rotations should include at least 1 year of close-growing grasses and legumes. Keeping tillage at a minimum, returning crop residue to the soil, or regularly adding other organic material improves soil tilth and fertility and increases the rate of water intake.

These soils are suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture also helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

These Sylvan and Bold soils are in capability subclass IVe.

962D3—Sylvan-Bold complex, 10 to 15 percent slopes, severely eroded. These soils are strongly sloping and are well drained. They are on side slopes of uplands. Over most of the area, the original surface layer has been removed by water erosion and tillage has mixed the rest with the upper part of the subsoil or the underlying material. The Sylvan soil is at a higher elevation than the Bold soil. This map unit is about 50 to 60 percent Sylvan soil and 40 to 50 percent Bold soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear and range from 3 to 90 acres.

Typically, the Sylvan soil has a brown, friable silty clay loam surface layer about 8 inches thick. The subsoil to a depth of about 27 inches is yellowish brown and friable. The upper part is silty clay loam, and the lower part is silt loam. The underlying material to a depth of 60 inches or more is mottled, friable, calcareous silt loam. The upper part is light brownish gray, and the lower part is light brownish gray and yellowish brown. In some areas, the subsoil has less clay, and in others, carbonates are at a depth of more than 40 inches.

Typically, the Bold soil has a brown, friable silt loam surface layer about 9 inches thick. It has some mixing of the underlying material. The underlying material to a depth of 60 inches or more is friable, calcareous silt loam. The upper part is yellowish brown, the next part is mottled yellowish brown and light yellowish brown, and the lower part is mottled yellowish brown and pale brown. In some areas, this soil has less clay.

Included with these soils in mapping are small areas of Arenzville and Radford soils in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Sylvan and Bold

Figure 9.—Erosion is a major concern in areas of the Sylvan-Bold complex, 10 to 15 percent slopes, severely eroded.

soils at a moderate rate. In cultivated areas, surface runoff is rapid. The available water capacity is very high. Organic matter content is low. The surface layer can become compact and cloddy if these soils are plowed when too wet.

These soils are used mainly for cultivated crops. In some areas, they are used for pasture and hay. These soils are poorly suited to cultivated crops. They are moderately suited to pasture and hay and to use as sites for dwellings and septic tank absorption fields.

Further water erosion is a hazard if these soils are used for corn, soybeans, or small grains (fig. 9). Also, tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation dominated by forage crops and by a combination of contour farming and conservation tillage. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil productivity, to prevent crusting, and to improve soil tilth.

These soils are suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture also helps to control erosion. Fertilizer is needed. The plants should not be grazed or clipped until they are sufficiently established.

Steepness of slope limits the use of these soils as sites for dwellings or septic tank absorption fields. Alteration of the slope by cutting, filling, and land

shaping helps to overcome this limitation on sites for dwellings. Filter lines should be installed on the contour to overcome the slope on sites for septic tank absorption fields.

These Sylvan and Bold soils are in capability subclass IVe.

962E2—Sylvan-Bold silt loams, 15 to 30 percent slopes, eroded. These soils are steep and are well drained. They are on side slopes of uplands. The Sylvan soil is at a higher elevation than the Bold soil. This map unit is about 50 to 55 percent Sylvan soil and 40 to 45 percent Bold soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear and range from 3 to 105 acres.

Typically, the Sylvan soil has a very dark grayish brown, friable silt loam surface layer about 3 inches thick. Part of the original surface layer has been removed by water erosion. The subsurface layer to a depth of about 6 inches is mixed dark grayish brown and dark brown, friable silt loam. The subsoil to a depth of about 28 inches is friable. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown, mottled silt loam. The underlying material to a depth of 60 inches or more is mottled, friable, calcareous silt loam. The upper part is light brownish gray and yellowish brown, and the lower part is light brownish gray. In some areas, this soil has less clay, and in other areas, it has more sand. The depth to carbonates is more than 40 inches in some areas.

Typically, the Bold soil has a dark brown, friable silt loam surface layer about 3 inches thick. Part of the original surface layer has been removed by water erosion. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam. In some places, this soil has less clay.

Included with these soils in mapping are small areas of Arenzville and Radford soils in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Sylvan and Bold soils at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderately low.

These soils are used mainly as pastureland or woodland and are moderately suited to these uses. They generally are not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields because of the steepness of slope.

These soils are suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control erosion and to maintain soil tilth. In areas where the pasture is established, using a no-till seeding system to seed legumes on the contour improves forage quality and helps to control water erosion. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain pasture.

Because of the steepness of slope, the water erosion hazard, equipment use limitation, and seedling mortality are concerns in managing these soils for timber production. Plant competition is also a concern. Laying out logging roads and skid trails on the contour helps to overcome the problems caused by slope and also helps to control erosion. Skidding logs or trees uphill with a cable and winch also helps. Because of the hazard of erosion, grass firebreaks are needed. Seeding all bare areas to grass or to a grass-legume mixture after completion of logging operations helps to control erosion. Machinery should be used only when the soil is firm enough to support the equipment. Seedling mortality can be reduced if all vegetation within 2 feet of the existing or planted seedlings is eliminated or if older and larger stock is planted. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

These Sylvan and Bold soils are in capability subclass VIe.

962E3—Bold-Sylvan complex, 15 to 30 percent slopes, severely eroded. These soils are steep and are well drained. They are on side slopes of uplands. Over most of the area, the original surface soil has been removed by water erosion and tillage has mixed the rest with the upper part of the subsoil or the underlying material. The Bold soil is at a lower elevation than the Sylvan soil. This map unit is about 50 to 60 percent Bold soil and 40 to 50 percent Sylvan soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear and range from 3 to 360 acres.

Typically, the Bold soil is calcareous. It has a yellowish brown, friable silt loam surface layer about 6 inches thick. The underlying material to a depth of 60

inches or more is mottled, friable silt loam. The upper part is yellowish brown and light brownish gray, and the lower part is light brownish gray. In some areas, this soil has less clay throughout the profile.

Typically, the Sylvan soil has a yellowish brown, friable silty clay loam surface layer about 6 inches thick. The subsoil to a depth of about 28 inches is yellowish brown and friable. The upper part is silty clay loam, the next part is silt loam, and the lower part is silt loam and is mottled. The underlying material to a depth of 60 inches or more is mottled yellowish brown and light brownish gray, friable, calcareous silt loam. In some areas, the subsoil has less clay, and in others, carbonates are at a depth of more than 40 inches.

Included with these soils in mapping are small areas of Arenzville and Radford soils in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Bold and Sylvan soils at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is low.

These soils are used mainly for cultivated crops. In some areas, they are used for pasture. These soils are moderately suited to pasture and hay. They generally are not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields because of the steepness of slope.

These soils are suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a no-till seeding system improves forage quality and helps to control erosion. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain the pasture.

These Bold and Sylvan soils are in capability subclass VIIe.

965D2—Tallula-Bold silt loams, 7 to 15 percent slopes, eroded. These soils are strongly sloping and are well drained. They are on side slopes of uplands. The Tallula soil is at a higher elevation than the Bold soil. This map unit is about 50 to 60 percent Tallula soil and 40 to 50 percent Bold soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear and range from 3 to 410 acres.

Typically, the Tallula soil has a very dark grayish brown, friable silt loam surface layer about 12 inches thick. The lower part of the surface layer is mixed with some subsoil material. The subsoil to a depth of about 31 inches is friable silt loam. The upper part is dark brown, and the lower part is yellowish brown and calcareous. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, calcareous silt loam. In some areas, the surface layer is thinner, and in others, this soil is calcareous at a depth of more than 35 inches. In some places, this soil has more clay throughout the profile.

Typically, the Bold soil is calcareous. It has a brown, friable silt loam surface layer about 8 inches thick. Part of the original surface layer has been removed by water erosion. The underlying material to a depth of 60 inches or more is mottled, friable silt loam. The upper part is yellowish brown and light brownish gray, and the lower part is light brownish gray. In some areas, this soil has less clay throughout the profile.

Included with these soils in mapping are small areas of Arenzville and Radford soils in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Tallula and Bold soils at a moderate rate. In cultivated areas, surface runoff is rapid. The available water capacity is very high. Organic matter content is moderate in the Tallula soil and moderately low in the Bold soil.

These soils are used mainly for cultivated crops. In some areas, they are used for pasture and hay. These soils are moderately suited to cultivated crops, pasture, hay, and to use as sites for dwellings and septic tank absorption fields.

Further erosion is a hazard if these soils are used for corn, soybeans, or small grains. Also, tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation dominated by forage crops and by a combination of contour farming and conservation tillage. Stripcropping also helps to control water erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil productivity, to prevent crusting, and to improve soil tilth.

These soils are suited to adapted forage and hay plants, such as bromegrass, orchardgrass, tall fescue, and alfalfa. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour to prepare a seedbed or to renovate the pasture helps to control erosion. Fertilizer is needed. The plants should

not be grazed or clipped until they are sufficiently established.

Steepness of slope limits the use of these soils as sites for dwellings or septic tank absorption fields. Alteration of the slope by cutting, filling, and land shaping helps to overcome this limitation on sites for dwellings. Filter lines should be installed on the contour to overcome the slope on sites for septic tank absorption fields.

These Tallula and Bold soils are in capability subclass IIIe.

965E—Tallula-Bold silt loams, 15 to 30 percent slopes. These soils are steep and are well drained. They are on side slopes of uplands. The Tallula soil is at a higher elevation than the Bold soil. This map unit is about 55 to 60 percent Tallula soil and 35 to 40 percent Bold soil. The areas of these soils are too small to be mapped separately at the selected scale. The areas are linear and range from 3 to 135 acres.

Typically, the Tallula soil has a very dark grayish brown, friable silt loam surface layer about 12 inches thick. The subsoil to a depth of about 29 inches is yellowish brown, friable silt loam. The lower part of the subsoil is mottled and calcareous. The underlying material to a depth of 60 inches or more is mottled, friable, calcareous silt loam. The upper part is strong brown and light brownish gray, and the lower part is light brownish gray. In some areas, the surface layer is thinner, and in others, this soil has more clay throughout the profile. In places, this soil is calcareous at a depth of more than 35 inches.

Typically, the Bold soil has a very dark grayish brown, friable silt loam surface layer about 4 inches thick. The subsurface layer to a depth of about 7 inches is mixed very dark grayish brown and dark brown, mottled, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is mottled, friable, calcareous silt loam. The upper part is light brownish gray and brown, the next part is dark yellowish brown and grayish brown, and the lower part is grayish brown and strong brown. In some areas, this soil has less clay throughout the profile.

Included with these soils in mapping are small areas of Arenzville, Hickory, and Radford soils. Arenzville and Radford soils are in drainageways. Arenzville soils are moderately well drained, and Radford soils are somewhat poorly drained. Hickory soils are on side slopes at a lower elevation than the Tallula and Bold soils. The included soils make up 2 to 10 percent of the map unit.

Water and air move through the Tallula and Bold soils at a moderate rate. Surface runoff is rapid. The available water capacity is very high. Organic matter content is moderate in the Tallula soil and moderately low in the Bold soil.

These soils are used mainly for pasture and are moderately suited to pasture and hay. They generally are not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields because of the steepness of slope.

These soils are suited to bromegrass, orchardgrass, tall fescue, and alfalfa, but erosion control is needed when grasses and legumes are established. A permanent cover of pasture plants helps to control water erosion and to maintain soil tilth. In areas where the pasture is established, seeding legumes on the contour using a no-till seeding system improves forage quality and helps to control erosion. Machinery is difficult to operate on the steeper slopes. Proper stocking, rotation grazing, deferred grazing, and fertilizing help to maintain the pasture.

These Tallula and Bold soils are in capability subclass VIe.

3070—Beaucoup silty clay loam, frequently flooded, undrained. This soil is nearly level and is poorly drained. It is on flood plains. Meander channels and numerous small bodies of water are in unprotected areas, and backwater sloughs and meander channels are in protected areas. This soil is frequently flooded or ponded for long periods from March to June. The areas of this soil are irregular in shape and range from 3 to 6,000 acres.

Typically, the surface layer is very dark gray, mottled, friable silty clay loam about 6 inches thick. The subsurface layer to a depth of about 23 inches is very dark gray, mottled, friable silty clay loam. The subsoil to a depth of about 39 inches is mottled dark grayish brown and dark gray and is friable. The upper part is silty clay loam, and the lower part is silt loam. The underlying material to a depth of 60 inches or more is mottled dark grayish brown and dark gray, friable silt loam. In some areas, the subsurface layer is thicker, and in others, this soil has more sand throughout the profile.

Water and air move through the Beaucoup soil at a moderately slow rate. Surface runoff is slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 2 feet below. The available water capacity is very high. Organic matter content is high.

This Beaucoup soil is used mainly as woodland (fig. 10). It is moderately well suited to woodland and well suited to use as habitat for wetland wildlife. This soil

Figure 10.—Beaucoup silty clay loam, frequently flooded, undrained, is well suited to woodland and to use as habitat for wildlife.

generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields because of flooding.

Because of wetness, the equipment use limitation, seedling mortality, and windthrow hazard are concerns in managing this soil for timber production. Plant competition is also a concern. Use of equipment is limited to periods when the soil is firm. Seedling mortality can be reduced by planting species that tolerate excessive moisture conditions, by planting on ridges, and by planting older and larger stock. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard. Only high-value trees should be removed from a 50 foot wide strip along the west and south edges of the woodland. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees

and the destruction of the leaf mulch.

This soil provides good habitat for wetland wildlife. Many shallow water areas are available. Grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements are also available. Some of the wildlife attracted to the areas of this soil are ducks, geese, shore birds, muskrats, frogs, turtles, and snakes.

This Beaucoup soil is in capability subclass Vw.

3073A—Ross loam, frequently flooded, 0 to 3 percent slopes. This soil is nearly level and is well drained. It is on flood plains and is flooded for brief periods from March to June. The areas of this soil are irregular in shape and range from 3 to 295 acres.

Typically, the surface layer is very dark grayish brown, friable loam about 9 inches thick. The subsurface layer to a depth of about 29 inches is very dark grayish brown, friable loam. The subsoil extends to a depth of 60 inches or more. The upper part is dark brown, friable loam; the next part is dark brown and dark yellowish brown, friable loam; and the lower part is yellowish brown, very friable loamy sand. In some areas, the subsurface layer is thinner. In some places, this soil has less clay throughout the profile, and in others, it has less sand throughout.

Included with this soil in mapping are small areas of Beaucoup soils in lower positions on the landscape. These soils are poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the upper part of the Ross soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 4 to 6 feet below the surface. The available water capacity is high. Organic matter content is moderate.

This Ross soil is used mainly for cultivated crops. In some areas, it is used as woodland. This soil is moderately suited to cultivated crops and very well suited to woodland. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

In areas of this soil that are used for corn or soybeans, flooding frequently delays planting and can cause crop damage. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil tilth and improve soil fertility.

Plant competition is a concern in managing this soil for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Ross soil is in capability subclass IIw.

3115—Dockery silt loam, frequently flooded. This soil is nearly level and is somewhat poorly drained. It is in meander channels in unprotected areas on flood plains. This soil is frequently flooded for long periods from March to June. The areas of this soil are irregular in shape and range from 10 to 1,200 acres.

Typically, the surface layer is stratified dark grayish brown, very dark grayish brown, and brown, mottled, friable silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is stratified, mottled, and friable. The upper part is dark grayish brown, very dark grayish brown, and brown silt loam; the next part is very dark grayish brown and grayish brown silty clay loam; and the lower part is very dark grayish brown, dark grayish brown, and grayish brown silty clay loam. In some areas, the surface layer has more sand, and in others, this soil has less clay throughout the profile. In some places, a seasonal high water table is within a depth of 2 feet.

Water and air move through the Dockery soil at a moderate rate. Surface runoff is slow. In spring, a seasonal high water table is 2 to 3 feet below the surface. The available water capacity is very high. Organic matter content is moderate.

This Dockery soil is used mainly as woodland and is moderately suited to this use. It is well suited to use as habitat for wetland wildlife. This soil is poorly suited to and generally not used for cultivated crops. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

If this soil is used for production of timber, livestock should be kept out of the area and the woodland needs to be protected from fire. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to trees. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This soil provides good habitat for wetland wildlife. Many shallow water areas are available. Grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements are also available. Ducks, geese, shore birds, muskrats, frogs, turtles, and snakes are attracted to areas of this soil.

This Dockery soil is in capability subclass IVw.

4776—Comfrey loam, ponded. This soil is nearly level and is very poorly drained. It is on flood plains and is frequently flooded for long periods from March to June. This soil is frequently ponded for very long periods. The areas of this soil are irregular in shape and range from 10 to 435 acres.

Typically, the surface layer is black, friable loam about 11 inches thick. The subsurface layer to a depth of about 30 inches is black, friable loam. The underlying material to a depth of 60 inches or more is friable. The upper part is mottled dark gray and very dark gray clay loam, and the lower part is stratified dark gray, very dark gray, and dark grayish brown sand. In some areas, the subsurface layer is thinner, and in others, this soil has less sand throughout the profile.

Water and air move through the Comfrey soil at a moderate rate. Surface runoff is ponded. During much of the year, a seasonal high water table is 2 feet above the surface to 1 foot below. The available water capacity is high. Organic matter content is high.

This Comfrey soil is mostly idle land and is well suited to use as habitat for wetland wildlife (fig. 11). It generally is not suited to cultivated crops or to use as sites for dwellings and septic tank absorption fields because of the ponding and flooding.

This soil provides good habitat for wetland wildlife. Many shallow water areas are available. Grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements are also available. Ducks, geese, shore birds, muskrats, frogs, turtles, and snakes are attracted to areas of this soil.

This Comfrey soil is in capability subclass VIIIw.

7070—Beaucoup silty clay loam, rarely flooded. This soil is nearly level and is poorly drained. It is on flood plains. This soil is occasionally ponded for brief periods from March to June. Because it is protected by a levee system, this soil is subject to only rare flooding. The areas of this soil are irregular in shape and range from 5 to 290 acres.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer to a depth of about 19 inches is black, mottled, friable silty clay loam. The subsoil to a depth of about 47 inches is mottled and friable. In sequence downward, it is very dark gray and dark grayish brown silty clay loam, dark grayish brown silty clay loam, dark grayish brown and grayish brown silty clay loam, grayish brown silty clay loam, and light brownish gray and yellowish brown silt loam. The underlying material to a depth of 60 inches or more is mottled light brownish gray and yellowish brown, friable silt loam. In some areas, the upper part of the subsoil is darker. In some places, this soil has more sand throughout the profile, and in others, it has less clay throughout.

Included with this soil in mapping are small areas of Darwin soils in slightly lower positions on the landscape. These soils are very slowly permeable. They make up 1 to 5 percent of the map unit.

Water and air move through the Beaucoup soil at a moderately slow rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is 0.5 foot above the surface to 2 feet below. The available water capacity is very high. Organic matter content is high. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Beaucoup soil is used mainly for cultivated crops and is well suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of ponding and flooding.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction, and increase the rate of water intake.

This Beaucoup soil is in capability subclass IIw.

7078—Arenzville silt loam, rarely flooded. This soil is nearly level and is moderately well drained. It is on flood plains. In most areas, this soil is protected by a levee system and is subject to only rare flooding. The areas of this soil are linear or irregular in shape and range from 5 to 500 acres.

Typically, the surface layer is dark brown, friable silt loam about 6 inches thick. The underlying material is brown and dark brown friable silt loam to a depth of about 36 inches. A buried soil extends to a depth of 60 inches or more. The upper part is mottled, very dark gray and very dark grayish brown, friable silt loam; the next part is black, friable silt loam; and the lower part is black, firm silty clay loam. In some areas, the surface layer is darker and thicker, and in others, the underlying material is calcareous. In some places, the buried soil is at a depth of more than 40 inches, and in a few places, it is at a depth of less than 20 inches. In some areas, a seasonal high water table is within a depth of 3 feet.

Included with this soil in mapping are small areas of Sawmill soils in slightly lower positions on flood plains.

Figure 11.—In most areas, Comfrey loam, ponded, is idle land. It is well suited to use as habitat for wetland wildlife.

These soils are poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Arenzville soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 3 to 6 feet below the surface. The available water capacity is very high. Organic matter content is moderately low.

This Arenzville soil is used mainly for cultivated crops. In some areas, it is used as pastureland or woodland. This soil is well suited to cultivated crops, pasture, and hay and is moderately well suited to woodland. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

No major limitations affect the use of this soil for corn, soybeans, or small grains. Conservation tillage helps to maintain soil tilth and productivity.

This soil is suited to bromegrass, orchardgrass, tall fescue, and alfalfa. Overgrazing reduces forage production and causes surface compaction and poor tilth. Proper stocking, rotation grazing, deferred grazing and applying fertilizer and lime help to maintain the pasture and the soil.

Plant competition is a concern in managing this soil

for timber production. Competition of undesirable vegetation can be reduced by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, to prevent compaction of the soil, and to prevent damage to tree roots. Fire protection helps to prevent the killing or permanent injury to trees and the destruction of the leaf mulch.

This Arenzville soil is in capability class I.

7107—Sawmill silty clay loam, rarely flooded. This soil is nearly level and is poorly drained. It is on flood plains. This soil is protected by a levee system and is subject to only rare flooding. The areas of this soil are linear or irregular in shape and range from 3 to 285 acres.

Typically, the surface layer is black, firm silty clay loam about 11 inches thick. The subsurface layer to a depth of about 34 inches is firm silty clay loam that is black in the upper part and very dark gray and mottled in the lower part. The subsoil to a depth of about 57 inches is mottled, firm silty clay loam. The upper part is grayish brown and strong brown, and the lower part is gray. The underlying material to a depth of 60 inches or more is gray, mottled, friable silt loam. In some areas, the subsurface layer is thinner, and in others, it is thicker. In places, this soil has more sand throughout the profile. In a few areas, a seasonal high water table is at a depth of more than 2 feet.

Included with this soil in mapping are small areas of Darwin soils in slightly lower positions on flood plains. These soils are very slowly permeable. They make up 1 to 5 percent of the map unit.

Water and air move through the Sawmill soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is within a depth of 2 feet. The available water capacity is high. Organic matter content is high. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Sawmill soil is used mainly for cultivated crops and is well suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction, and increase the rate of water intake.

This Sawmill soil is in capability subclass IIw.

7284—Tice silty clay loam, rarely flooded. This soil is nearly level and is somewhat poorly drained. It is on flood plains. This soil is protected by a levee system and is subject to only rare flooding. The areas of this soil are irregular in shape and range from 4 to 95 acres.

Typically, the surface layer is very dark gray, friable silty clay loam about 11 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown, mottled, friable silty clay loam. The subsoil to a depth of about 46 inches is mottled and friable. The upper part is dark grayish brown silty clay loam, the next part is brown silty clay loam, and the lower part is grayish brown and brown silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable silt loam. In some areas, the upper part of the subsoil is darker. In some places, this soil has less clay throughout the profile, and in others, it has more sand throughout. In some places, a seasonal high water table is within a depth of 1 foot.

Water and air move through the Tice soil at a moderate rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1 foot to 3 feet below the surface. The available water capacity is very high. Organic matter content is moderate. The surface layer is compact and cloddy if this soil is plowed when too wet.

This Tice soil is used mainly for cultivated crops and is well suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

No major limitations affect the use of this soil for corn, soybeans, or small grains. Conservation tillage improves soil tilth and helps to maintain soil productivity.

This Tice soil is in capability class I.

7302—Ambraw clay loam, rarely flooded. This soil is nearly level and is poorly drained. It is on flood plains. This soil is protected by a levee system and is subject to only rare flooding (fig. 12). It is occasionally ponded for brief periods from March to June. The areas of this soil are irregular in shape and range from 3 to 2,330 acres.

Typically, the surface layer is very dark gray, firm clay loam about 9 inches thick. The subsurface layer to a depth of about 14 inches is very dark gray, mottled, firm clay loam. The subsoil to a depth of about 48 inches is mottled, friable clay loam that is dark gray in the upper part and gray in the lower part. The

Figure 12.—Levees along the Illinois River protect this area of Ambraw clay loam, rarely flooded.

underlying material to a depth of 60 inches or more is mottled gray, strong brown, and light gray, friable, stratified clay loam and loam. In some areas, the upper part of the subsoil is darker, and in others, this soil has less sand throughout the profile.

Included with this soil in mapping are small areas of Medway soils in higher positions on flood plains. These soils are moderately well drained. They make up 1 to 5 percent of the map unit.

Water and air move through the Ambraw soil at a moderately slow rate. In cultivated areas, surface runoff is slow to ponded. In spring, a seasonal high water table is within 2 feet of the surface. The available water capacity is high. Organic matter content is moderate.

This Ambraw soil is used mainly for cultivated crops and is well suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

If this soil is drained, it can be used for corn, soybeans, or small grains. A drainage system has been installed in most areas, and maintenance of the system is needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Such practices as conservation tillage and returning crop residue to the soil improve tilth, help to prevent surface compaction, and increase the rate of water intake.

This Ambraw soil is in capability subclass IIw.

7682—Medway loam, rarely flooded. This soil is nearly level and is moderately well drained. It is on

flood plains and low terraces. This soil is protected by a levee system and is subject to only rare flooding. The areas of this soil are irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is very dark grayish brown, friable loam about 10 inches thick. The subsurface layer to a depth of about 17 inches is dark brown, friable loam. The subsoil to a depth of about 54 inches is friable. The upper part is brown loam; the next part is dark yellowish brown, mottled loam; and the lower part is dark yellowish brown sandy loam. The underlying material to a depth of 60 inches or more is dark yellowish brown and reddish brown, friable, stratified silty clay loam and loam. In some areas, the subsurface layer is thicker. In some places, this soil has less clay throughout the profile, and in others, it has less sand throughout.

Included with this soil in mapping are small areas of Ambraw soils in lower positions on flood plains. These soils are poorly drained. They make up 1 to 5 percent of the map unit.

Water and air move through the upper part of the Medway soil at a moderate rate and through the lower part at a moderate or moderately rapid rate. In cultivated areas, surface runoff is slow. In spring, a seasonal high water table is 1.5 to 3 feet below the surface. The available water capacity is high. Organic matter content is moderate.

This Medway soil is used mainly for cultivated crops and is well suited to this use. It generally is not suited to use as sites for dwellings and septic tank absorption fields because of flooding.

No major limitations affect the use of this soil for corn, soybeans, or small grains. Conservation tillage helps to maintain soil tilth and productivity.

This Medway soil is in capability class I.

Prime Farmland

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

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

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

About 130,670 acres in Cass County, or 55 percent of the total land area, meets the requirements for prime farmland. This land generally is used for crops, mainly corn and soybeans, which account for most of the local farm income each year.

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

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

Soils that have limitations, such as a seasonal high water table, or hazards, such as frequent flooding during the growing season, qualify for prime farmland only in areas where these limitations or hazards have been overcome by such measures as drainage or flood control. The need for these measures is indicated after the map unit name. Onsite evaluation is needed to determine whether or not these limitations or hazards have been overcome by corrective measures.

The map units that meet the requirements for prime farmland are:

17A	Keomah silt loam, 0 to 3 percent slopes (where drained)
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes
37	Worthen silt loam
43A	Ipava silt loam, 0 to 2 percent slopes
43B	Ipava silt loam, 2 to 5 percent slopes
68	Sable silty clay loam (where drained)
70	Beaucoup silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
71	Darwin silty clay (where drained)
74	Radford silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
78	Arenzville silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
81	Littleton silt loam
87B	Dickinson fine sandy loam, 1 to 5 percent slopes
107	Sawmill silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
131B	Alvin fine sandy loam, 2 to 5 percent slopes
131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded
172	Hoopeston sandy loam
188A	Beardstown loam, 0 to 3 percent slopes (where drained)
200	Orio loam (where drained)
201	Gilford sandy loam (where drained)
206	Thorp silt loam (where drained)
244	Hartsburg silty clay loam (where drained)
279A	Rozetta silt loam, 0 to 2 percent slopes
279B	Rozetta silt loam, 2 to 5 percent slopes
280B	Fayette silt loam, 2 to 5 percent slopes
284	Tice silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
302	Ambraw clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
304A	Landes fine sandy loam, frequently flooded, 0 to 3 percent slopes (where protected from flooding or not frequently flooded during the growing season)
430B	Raddle silt loam, 2 to 5 percent slopes
451	Lawson silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
682	Medway loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
776	Comfrey clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3073A	Ross loam, frequently flooded, 0 to 3 percent slopes (where protected from flooding or not frequently flooded during the growing season)
7070	Beaucoup silty clay loam, rarely flooded (where drained)
7078	Arenzville silt loam, rarely flooded
7107	Sawmill silty clay loam, rarely flooded (where drained)
7284	Tice silty clay loam, rarely flooded
7302	Ambraw clay loam, rarely flooded (where drained)
7682	Medway loam, rarely flooded

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 avoid 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 behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

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

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

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

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

Crops and Pasture

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

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

In 1982, about 177,044 acres in Cass County was cropland, 11,446 acres was pasture, 20,896 acres was woodland, and 11,070 acres was roads and other built-up areas *(11)*.

The soils in Cass County have good potential for continued crop production, particularly if the latest crop production technology is applied. This soil survey can greatly facilitate the application of such technology. The main concerns in managing the cropland and pastureland in the county are erosion, soil blowing, drainage, droughtiness, and soil tilth.

Potential water erosion is a major problem on about 48 percent of the cropland and pastureland in the county. About 27 percent of the cropland is adequately treated to control water erosion. Erosion is a hazard where the slope is more than 2 percent and, the longer the slope length, the more severe the hazard becomes.

Sheet erosion, or loss of the surface layer is damaging. The organic matter content and natural fertility levels are lowered as the surface layer is lost and part of the subsoil is incorporated into the plow layer. As a result, soil productivity is reduced. Erosion also impairs tilth in the surface layer and reduces the intake of water. Erosion is especially damaging on soils that have a clay content in excess of about 30 percent in the surface layer. These soils tend to be cloddy if worked when wet and to crust after hard rains. Preparing a good seedbed on these soils is difficult

because of the cloddiness, and runoff is increased if the surface is crusted.

Soil erosion on farmland also results in sediment entering streams, rivers, ponds, or road ditches. Control of sediment pollution improves the quality of water available for municipal and recreational uses and for fish and wildlife.

A good management system maintains or improves natural fertility, removes excess water, controls water erosion and soil blowing, maintains good tilth, and increases infiltration. A cropping system that keeps plant cover or crop residue on the surface for extended periods during the year reduces erosion and helps to maintain soil productivity. Including grasses and legumes in the crop rotation reduces crusting, improves tilth, and provides nutrients for the following crop.

Contour farming, contour stripcropping, terraces, and diversions help control water erosion and reduce runoff. These practices are most effective on soils that have uniform and regular slopes, such as Raddle and Tallula soils. Soils on short slopes with irregular topography, such as Sylvan soils, need a cropping rotation that provides adequate plant cover to control water erosion.

Conservation tillage systems, such as chisel plowing, zero tillage, and ridge planting, help to control water erosion, reduce runoff, and increase the rate of water intake.

Chisel plowing is suitable on most of the tillable soils in the county. Zero tillage is most successful on well drained soils, such as the Tama and Tallula soils, rather than on poorly drained soils, such as the Hartsburg soils, because the wet conditions delay planting and reduce seed germination. Ridge planting is suitable on most of the nearly level soils in the county. When used on poorly drained soils, such as Beaucoup, Hartsburg, and Sable soils, ridge planting helps the seedbed temperature to warm earlier in spring.

Soil blowing is a hazard on the sandy Bloomfield and Sparta soils. Field windbreaks, conservation tillage, and maintenance of plant cover reduce soil blowing and crop damage caused by the moving soil particles. For row crops, the use of conservation tillage systems that leave crop residue on the surface after planting is increasing in Cass County. Conservation tillage is effective in reducing erosion on sloping soils and can be used on most soils in the county.

Grassed waterways help to carry excess surface water safely downslope to the nearest creek, stream, or other watercourse (fig. 13). When grassed waterways are established in natural drainageways, they prevent the surface runoff from carrying soil downslope. To effectively manage rainfall, increase water retention, and reduce soil loss, grassed waterways generally are installed in conjunction with other conservation practices, such as terraces, diversions, conservation tillage systems, and contour farming operations.

Crop rotations that include wheat, or other small grains, and hay help to control water erosion on soils that are sloping to steep, such as the Fayette and Sylvan soils. Such rotations, in addition to reducing soil losses, can increase organic matter content, soil nitrogen, and water retention. They can also improve soil tilth. Changing the soil environment with crop rotations also helps to control some weeds and insects in the soil.

Information about controlling water erosion and soil blowing for each kind of soil is in the Technical Guide, which is available in local offices of the Soil Conservation Service.

Soil drainage benefits crop production on soils that are somewhat poorly drained or poorly drained. In Cass County, drainage systems have been installed on many of these soils. Poorly drained soils require some form of drainage system for the crops commonly grown in the area. Crop production can be improved on some of these soils by installing additional drainage. The Ambraw, Beaucoup, Hartsburg, and Sable soils are poorly drained. The somewhat poorly drained soils are wet enough in some years to delay planting, which can reduce yields. The Ipava, Littleton, and Tice soils are somewhat poorly drained.

The design of surface and subsurface drainage systems varies with the kind of soil. Tile drains alone are inadequate in many soils. A combination of open drainage ditches and tile is needed in some areas of poorly drained soils, such as Ambraw, Beaucoup, and Sawmill soils. Tile drains are not effective in very slowly permeable soils, such as Darwin soils, and open ditches are needed to drain these soils. If adequate outlets are available, tile drains are effective in moderately slowly permeable and moderately permeable soils, such as Ipava and Littleton soils.

Information about the drainage system suitable for each kind of soil is contained in the Technical Guide, which is available in local offices of the Soil Conservation Service.

Soil droughtiness limits the productivity of some of the soils used for crops and pasture. The physical composition of these soils limits the amount of plant available water that is needed for the optimum growth of plants during dry periods. Bloomfield and Sparta soils are examples. Zero tillage and crop residue management help to conserve soil moisture and improve yields. Planting drought-tolerant crops and

Figure 13.—Grassed waterways remove excess surface water and prevent the formation of gullies.

varieties also increases yields.

The natural fertility levels for the soils in Cass County range from low, such as in Sylvan soils, to high, such as in Hartsburg soils. Plants on the majority of the soils in the county respond well to nitrogen, phosphorus, and potassium fertilizers. The soils range from acidic to calcareous. Fayette and Rozetta soils are acidic and need applications of ground limestone to raise the pH for optimum crop production. Bold soils are calcareous and do not require liming because of their naturally high pH. On all soils, the kind and amount of lime and fertilizer to be applied should be based on the results of soil tests, the needs of the crop, and the expected level of yields. The Cooperative Extension Service can help in determining the rates of lime and fertilizer applications after soil tests are made.

Soil tilth is an important factor in the germination of seeds, in the amount of runoff, and in the rate of water intake into the soil. Topsoil that has good tilth is granular and porous.

In Cass County, most of the soils used for crops have a silt loam or silty clay loam surface layer. Some of these soils have a lower organic matter content than other soils. Generally, the structure of soils that have low organic matter content is weak, and intensive rainfall causes a crust to form on the surface. The crust is hard when dry and is nearly impervious to water. Once the crust forms, the infiltration rate decreases and runoff increases. Leaving crop residue on the surface or regularly adding manure or other organic material improves soil structure and reduces crusting.

Poor tilth is also a problem in poorly drained, clayey soils, such as Darwin soils. Tilling these soils when they are wet tends to form clods and, as a result, preparing

a good seedbed is difficult. These soils often stay wet until late in spring, which limits the opportunity for primary tillage in spring. If these soils are tilled in the fall, crop residue left on the surface helps to prevent soil blowing.

The main field crops grown in Cass County are corn and soybeans. Small grains and forage are also grown, but could be used more extensively on nearly all of the cropland for effective erosion control and improvement of natural soil fertility.

The latest information and suggestions for crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Proper management is needed on pastureland and hayland to prolong the life of desirable forage species, to maintain or to improve the quality and quantity of forage, and to control erosion and reduce runoff. The somewhat poorly drained to well drained soils, such as Fayette, Keomah, Rozetta, Sylvan, and Tama soils, are suited to alfalfa, red clover, orchardgrass, tall fescue, and bromegrass. The poorly drained soils, such as Hartsburg and Sable soils, are suited to alsike clover, ladino clover, and reed canarygrass. Good pasture management includes rotation grazing to provide adequate protection for the forage species; delayed grazing in the spring until the soil is firm enough to prevent soil compaction and to ensure sufficient plant growth has been reached; proper stocking for efficient utilization of forage produced and to avoid overgrazing or undergrazing (fig. 14); delayed grazing, especially of legumes, from September 15 to October 15 to reduce winter kill; harvesting when the forage is at the proper stage of maturity for maximum quality feed; applying lime and fertilizer according to soil tests, plant needs, and the desired production level; and controlling competing weeds and brush.

Information about establishing and renovating pastureland and hayland is in the Technical Guide, which is available in local offices of the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops *(9)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

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

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

Figure 14.—Proper stocking helps to keep pastures in good condition.

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion

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

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

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Before settlement, hardwood forest covered about 83,200 acres of Cass County. As the county became populated, the forest land gradually was cleared for farming. Today, about 21,000 acres of woodland remain. The majority of the woodland is in relatively small, privately owned woodlots; however, the largest continuous acreage of forest land is in the state-owned Sanganois Conservation Area. About 5,464 acres of the forest land is federal, state, or county owned.

Most of the woodland is in areas of soils that generally are not suited to cultivation because of wetness, droughtiness, or steepness of slope. Soils that have these properties have fair to good potential for production of high quality trees.

In Cass County, the woodland is mostly in areas of general soil map units 1, 2, 7, and 9. Red oak, white oak, black walnut, and shagbark hickory are the dominant species in map units 1 and 2. Silver maple, cottonwood, American elm, and black ash are well adapted to the bottom land soils in map unit 9. The sandy upland soils in map unit 7 have stands of oaks and hickories, however, these soils are well suited to red pine, white pine, and jack pine. Christmas tree production is also a common land use on these soils (fig. 15).

Much of the woodland can be improved by harvesting mature trees and by removing the nonmerchantable trees that retard the growth of desirable species. Fire protection, livestock exclusion, and disease and insect control increase productivity. Tree planting is needed unless stocking is adequate. Control of competing vegetation is needed if seedlings are planted. Seeding grass or grass-legume mixtures between rows of the planted seedlings helps to control erosion. If erosion is excessive or the slope is more than 15 percent, runoff should be diverted away from haul roads and skid trails. Machinery should be used only when the soil is firm enough to support the weight of the machinery.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol of each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

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

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

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

Equipment limitations reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the

Figure 15.—Christmas trees are grown on many of the sandy soils in Cass County. These trees are in an area of the Bloomfield-Plainfield-Alvin general soil map unit.

surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of uses. If the soil is wet, the wetness restricts equipment use for more than 3 months.

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

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

The *potential productivity* of merchantable or *common*

trees on a soil is expressed as a *site index* and as a *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 woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand.

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

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

Windbreaks and Environmental Plantings

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

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

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

Table 7 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 7 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Cass County has numerous recreational facilities available to the public. Each municipality offers a varied range of recreational facilities and activities. Privately owned gun, golf, lake, and creek clubs are also in the county.

The largest recreational facility in the county is the state-owned Sanganois Conservation Area (fig. 16). It is managed as a refuge for migratory waterfowl, and a public duck hunting area is provided. The Panther Creek Conservation Area is also owned by the state. These conservation areas provide both woodland and openland for hunting, hiking, and sightseeing.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

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

Figure 16.—The Sanganois Conservation Area is the largest recreational facility in Cass County. It is also managed as a refuge for migratory waterfowl.

heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

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

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

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

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

Wildlife Habitat

Areas used as wildlife habitat are not necessarily set aside for this purpose. Many nearly level to sloping soils used for crops and pasture in Cass County generally are well suited to use as habitat for openland wildlife, such as rabbits, pheasant, bobwhite quail, red fox, and meadowlark.

Habitat for woodland wildlife generally is in areas of soils that are too steep for cultivation, in small dissected areas along streams, and in areas of soils that are not suitable for farming because of poor drainage or droughtiness. These wooded areas provide habitat for squirrel, opossum, gray fox, raccoon, white-tailed deer, and woodcock.

Habitat for wetland wildlife consists of open, marshy, shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds,

muskrat, frogs, turtles, and snakes.

The kind and abundance of wildlife in Cass County reflect the soil types, land use, and vegetation. About 40 percent of the soils developed under native plant communities dominated by tall prairie grasses. Wildlife that was formerly abundant in this prairie habitat included prairie chickens, upland sandpipers, and other grassland birds and mammals. The native woodland habitat originally covered about 35 percent of the county. After the county was settled, drainage systems were installed in the prairie areas, trees were cleared, and the acreage of cultivated crops increased rapidly. These changes altered the wildlife communities, favoring the more adaptable species and those more tolerant of human settlements, such as the horned lark, cardinal, mourning dove, raccoon, and white-tailed deer.

Good management can improve the habitat for wildlife. Leaving crop residue on the surface during the fall and winter, for example, not only helps control erosion but it also greatly improves the habitat for openland wildlife. Deferred mowing of grassed waterways, roadsides, and fence rows until early in August after the nesting season, can significantly increase the annual production of pheasants, meadowlarks, rabbits, and other wildlife that nest on the ground. Measures that exclude livestock from woodland, wetland, and stream banks markedly improve the habitat.

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

In table 9, 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 flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and soybeans.

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, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, 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 flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, ragweed, and foxtail.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of

the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, 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. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

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

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, beaver, frogs, turtles, and snakes.

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. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind 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 (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is

evaluated to a depth of 5 or 6 feet.

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

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

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

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and

site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

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 characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

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

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

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

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

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

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

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to

buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.
3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.
5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.
6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.
7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.
8. Stony or gravelly soils and other soils not subject to soil blowing.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, 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 of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These

soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 16, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

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 absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 17 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(10)*. 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 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix thatindicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (8)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (10)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alvin Series

The Alvin series consists of well drained soils on stream terraces and uplands. These soils formed in eolian and water-deposited material. They are moderately permeable in the upper part of the profile and moderately rapidly permeable in the lower part. Slope ranges from 2 to 15 percent.

Alvin soils are similar to Hickory soils and commonly are adjacent to Bloomfield, Fayette, Orio, and Plainfield soils. Bloomfield and Plainfield soils are sandy and are in positions similar to those of the Alvin soils. Bloomfield soils are somewhat excessively drained and Plainfield soils are excessively drained. Fayette soils formed in loess and are in positions slightly lower than those of the Alvin soils. Hickory soils formed in glacial till and are in positions similar to those of the Alvin soils. Orio soils are poorly drained and are in shallow depressions.

Typical pedon of Alvin fine sandy loam, 2 to 5 percent slopes; 235 feet south and 2,160 feet west of the northeast corner of sec. 4, T. 17 N., R. 11 W.

Ap—0 to 11 inches; dark brown (10YR 4/3) fine sandy loam, yellowish brown (10YR 5/4) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; very few fine roots; many faint dark brown (10YR 3/3) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

Bt1—11 to 22 inches; dark yellowish brown (10YR 4/4) loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many faint dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—22 to 28 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—28 to 34 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) fine sandy loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt4—34 to 48 inches; yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) fine sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

BC—48 to 53 inches; yellowish brown (10YR 5/4) very fine sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

C—53 to 60 inches; yellowish brown (10YR 5/4) very fine sandy loam; massive; very friable; few very fine roots; strongly acid.

The solum ranges from 45 to more than 60 inches in thickness. The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. In uncultivated areas, an E horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The Bt horizon has hue of 10YR or 7.5YR and chroma of 4 to 6. It is loam, very fine sandy loam, fine sandy loam, or sandy loam.

Ambraw Series

The Ambraw series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Ambraw soils are similar to Beaucoup and Comfrey soils and commonly are adjacent to Beaucoup, Darwin, Medway, and Plainfield soils. Beaucoup and Comfrey soils are in positions similar to those of the Ambraw soils. Beaucoup soils are fine-silty, and Comfrey soils have a thicker mollic epipedon. Darwin soils are clayey and are slightly lower on the flood plain than the Ambraw soils. The Medway soils are in positions slightly higher and are moderately well drained. Plainfield soils are sandy and excessively drained. They are on stream terraces at a higher elevation than the Ambraw soils.

Typical pedon of Ambraw clay loam, rarely flooded; 140 feet north and 1,350 feet west of the center of sec. 30, T. 18 N., R. 12 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) clay loam, dark grayish brown (10YR 4/2) dry; weak medium granular structure; firm; few very fine roots; medium acid; abrupt smooth boundary.

A—9 to 14 inches; very dark gray (10YR 3/1) clay loam, dark grayish brown (10YR 4/2) dry; few fine prominent reddish brown (5YR 4/3) mottles; weak medium subangular blocky structure parting to weak medium granular; firm; few very fine roots; slightly acid; clear smooth boundary.

Bg1—14 to 28 inches; dark gray (10YR 4/1) clay loam; many fine prominent reddish brown (5YR 4/3) and brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bg2—28 to 38 inches; dark gray (10YR 4/1) clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

BCg—38 to 48 inches; gray (10YR 5/1) clay loam; many fine distinct strong brown (7.5YR 5/6) mottles and common fine faint light gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.

Cg—48 to 60 inches; mottled gray (10YR 5/1), strong brown (7.5YR 5/6), and light gray (10YR 6/1) stratified clay loam and loam; massive; friable; neutral.

The solum ranges from 40 to 60 inches in thickness. The mollic epipedon ranges from 10 to 24 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is clay loam or loam. The Cg horizon is stratified clay loam to sandy loam.

Arenzville Series

The Arenzville series consists of moderately well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium and have a buried soil within a depth of 40 inches. Slope ranges from 0 to 2 percent.

Arenzville soils commonly are adjacent to Bold, Hickory, Radford, Seaton, and Sylvan soils. Bold, Hickory, Seaton, and Sylvan soils are on side slopes on the uplands. These soils are well drained. Radford soils are somewhat poorly drained and have a mollic epipedon. They are in positions similar to those of the Arenzville soils.

Typical pedon of Arenzville silt loam, rarely flooded; 930 feet north and 120 feet east of the center of sec. 27, T. 18 N., R. 11 W.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak thin platy structure parting to weak fine granular; friable; few very fine roots; many faint dark brown (10YR 3/3) organic coatings on faces of peds; mildly alkaline; abrupt smooth boundary.

C1—6 to 14 inches; brown (10YR 4/3) silt loam; massive; friable; few very fine roots; common faint dark brown (10YR 3/3) organic coatings on cleavage planes; mildly alkaline; gradual smooth boundary.

C2—14 to 36 inches; brown (10YR 4/3) and dark brown (10YR 3/3) silt loam; massive; friable; few very fine roots; few medium dark brown (7.5YR 4/4) stains (iron and manganese oxides); mildly alkaline; clear wavy boundary.

Ab1—36 to 45 inches; very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2) silt loam; common fine faint brown (10YR 4/3) mottles; weak fine and medium granular structure; friable; mildly alkaline; abrupt smooth boundary.

Ab2—45 to 56 inches; black (10YR 2/1) silt loam; weak very fine and fine subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

Ab3—56 to 60 inches; black (10YR 2/1) silty clay loam; weak fine subangular blocky structure; firm; few medium brown (10YR 4/3) krotovina; mildly alkaline.

The depth to the Ab horizon ranges from 20 to 40 inches. The Ap or A horizon has chroma of 2 or 3. The C horizon has value of 3 to 5 and chroma of 2 or 3. The Ab horizon has chroma of 1 or 2.

Beardstown Series

The Beardstown series consists of somewhat poorly drained soils on stream terraces. They are moderately permeable or moderately slowly permeable in the upper part of the profile and moderately rapidly permeable in the lower part. These soils formed in loamy material. Slope ranges from 0 to 3 percent.

Beardstown soils are similar to Orio soils and commonly are adjacent to Ambraw, Gilford, and Orio soils. Ambraw and Gilford soils do not have an albic horizon and have a thicker mollic epipedon than that of the Beardstown soils. Ambraw soils are poorly drained and are on flood plains. Gilford and Orio soils are in depressions. Orio soils are poorly drained.

Typical pedon of Beardstown loam, 0 to 3 percent slopes; 1,482 feet south and 1,425 feet west of the northeast corner of sec. 32, T. 18 N., R. 12 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to weak

medium granular; friable; few very fine and fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

E—9 to 14 inches; dark grayish brown (10YR 4/2) loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium platy; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings and common distinct light brownish gray (10YR 6/2) dry silt coatings on faces of peds; common fine and medium dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

BE—14 to 21 inches; brown (10YR 4/3) loam; few fine distinct strong brown (7.5YR 4/6) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films and common distinct light brownish gray (10YR 6/2) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt1—21 to 32 inches; brown (10YR 5/3) loam; common fine and medium distinct strong brown (7.5YR 4/6) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; many faint grayish brown (10YR 5/2) clay films and distinct light gray (10YR 7/2) dry silt coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt2—32 to 38 inches; grayish brown (10YR 5/2) clay loam; common medium and coarse distinct strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; very fine roots; common faint brown (7.5YR 5/2) clay films and common distinct light gray (10YR 7/2) dry silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Bt3—38 to 41 inches; mottled brown (10YR 5/3), grayish brown (10YR 5/2), and strong brown (7.5YR 4/6) stratified loam and sandy loam; weak medium subangular blocky structure; friable; few very fine roots; few common faint brown (7.5YR 4/2) clay films and distinct light gray (10YR 7/2) dry silt coatings on faces of peds; very strongly acid; clear smooth boundary.

BC—41 to 48 inches; mottled brown (10YR 5/3) and dark yellowish brown (10YR 4/4) stratified loamy sand and sandy loam; weak medium subangular blocky structure; very friable; common faint brown (7.5YR 4/2) clay films on vertical faces of peds; distinct light gray (10YR 7/2) dry silt coatings on faces of peds; strongly acid; clear smooth boundary.

C—48 to 60 inches; dark yellowish brown (10YR 4/4) stratified loamy sand and sandy loam; massive; very friable; strongly acid.

The solum ranges from 45 to 60 inches in thickness. The dark color surface layer ranges from 7 to 9 inches in thickness.

The Ap horizon has chroma of 1 or 2. The E horizon is loam or sandy loam. The Bt horizon has value of 4 or 5. It is loam, clay loam, or sandy loam. The C horizon is stratified loam, sandy loam, or loamy sand.

Beaucoup Series

The Beaucoup series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Beaucoup soils are similar to Ambraw and Sawmill soils and commonly are adjacent to Ambraw, Darwin, Dockery, and Sawmill soils. Ambraw and Sawmill soils are in positions similar to those of the Beaucoup soils. Ambraw soils are fine-loamy, and Sawmill soils have a thicker mollic epipedon. Darwin soils are fine textured and are slightly lower on the flood plain than the Beaucoup soils. Dockery soils are somewhat poorly drained and are in slightly higher positions.

Typical pedon of Beaucoup silty clay loam, frequently flooded; 890 feet north and 1,170 feet east of the southwest corner of sec. 32, T. 17 N., R. 12 W.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate very fine and fine granular; friable; few very fine roots; slightly acid; abrupt smooth boundary.

A—10 to 18 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium subangular blocky structure; firm; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

BAg—18 to 22 inches; mottled very dark gray (10YR 3/1), dark gray (10YR 4/1), and yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; few faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg1—22 to 32 inches; mottled dark grayish brown (2.5Y 4/2), grayish brown (2.5Y 5/2), and yellowish brown

(10YR 5/6) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many faint dark gray (10YR 4/1) coatings on faces of peds; neutral; clear smooth boundary.

Bg2—32 to 41 inches; mottled grayish brown (2.5Y 5/2), yellowish brown (10YR 5/6), and dark grayish brown (2.5Y 4/2) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint dark gray (10YR 4/1) coatings on faces of peds; neutral; clear smooth boundary.

BCg—41 to 50 inches; mottled grayish brown (2.5Y 5/2), yellowish brown (10YR 5/6), and light brownish gray (2.5Y 6/2) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; few faint dark gray (10YR 4/1) coatings on faces of peds; neutral; clear smooth boundary.

Cg—50 to 60 inches; mottled light brownish gray (2.5Y 6/2), grayish brown (2.5Y 5/2), yellowish brown (10YR 5/6), and gray (5Y 6/1) sandy clay loam; massive; friable; few very fine roots; neutral.

The solum ranges from 38 to 60 inches in thickness. The mollic epipedon ranges from 12 to 24 inches in thickness.

The Ap and A horizons have chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. The Cg horizon is sandy clay loam, silty loam, or silty clay loam and is stratified with sandier textures in some pedons.

Bloomfield Series

The Bloomfield series consists of somewhat excessively drained, rapidly permeable soils on uplands and stream terraces. These soils formed in sandy material. Slope ranges from 1 to 15 percent.

The Bloomfield soils in this survey area are taxadjuncts to the Bloomfield series because they have more clay in the subsoil than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Bloomfield soils are similar to Plainfield soils and commonly are adjacent to Alvin, Orio, and Plainfield soils. Alvin and Plainfield soils are in positions similar to those of the Bloomfield soils. Alvin soils are well drained and are coarse-loamy. Plainfield soils are excessively drained and do not have an argillic horizon. Orio soils are in shallow depressions and are poorly drained. They are fine-loamy, and have a darker surface layer than that of the Bloomfield soils.

Typical pedon of Bloomfield fine sand, 1 to 7 percent slopes; 2,511 feet south and 612 feet west of the northeast corner of sec. 33, T. 18 N., R. 11 W.

Ap—0 to 9 inches; dark brown (10YR 4/3) fine sand, pale brown (10YR 6/3) dry; weak fine and medium subangular blocky structure parting to weak fine granular; very friable; few very fine roots; neutral; abrupt smooth boundary.

E—9 to 36 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine and medium subangular blocky structure; loose; few very fine roots; neutral; abrupt smooth boundary.

E&Bt1—36 to 52 inches; yellowish brown (10YR 5/4) loamy fine sand (E part); single grained; very friable; lamellae and bands of dark brown (7.5YR 4/4) fine sandy loam (Bt part); weak fine and medium subangular blocky structure; friable; wavy and discontinuous 0.25 to 0.5 inch lamellae having a total thickness of about 3 inches; slightly acid; clear wavy boundary.

E&Bt2—52 to 60 inches; dark yellowish brown (10YR 4/4) loamy fine sand (E part); single grained; very friable; lamellae and bands of dark brown (7.5YR 4/4) fine sandy loam (Bt part); weak medium subangular blocky structure; friable; nearly continuous 8 inch lamellae; slightly acid.

The solum is more than 60 inches thick. Lamellae are below a depth of 34 inches.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has value of 4 or 5 and chroma of 3 to 6. It is sand, fine sand, loamy sand, or loamy fine sand. The E part of the E&Bt horizon has chroma of 4 to 6. It is sand, fine sand, loamy sand, or loamy fine sand. The Bt part of the E&Bt horizon has chroma of 4 to 6 and is sandy loam, fine sandy loam, loamy sand, or loamy fine sand.

Bold Series

The Bold series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 5 to 30 percent.

Bold soils are similar to Hamburg soils and commonly are adjacent to Arenzville, Radford, Sylvan, and Tallula soils. Arenzville and Radford soils are not calcareous and are in drainageways. Hamburg soils are somewhat excessively drained and generally have less clay throughout the profile than the Bold soils. Sylvan

and Tallula soils are not calcareous within a depth of 20 inches and are on side slopes at a higher elevation than the Bold soils.

Typical pedon of Bold silt loam, 7 to 15 percent slopes, eroded; 225 feet north and 1,845 feet west of the southeast corner of sec. 14, T. 17 N., R. 11 W.

Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; few fine and medium concretions (calcium carbonate); strong effervescence; mildly alkaline; abrupt smooth boundary.

C1—8 to 26 inches; light brownish gray (10YR 6/2) silt loam; common medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; few fine and medium dark stains (iron and manganese oxides); few fine and medium snail shells; strong effervescence; moderately alkaline; gradual smooth boundary.

C2—26 to 60 inches; light brownish gray (10YR 6/2) silt loam; common medium and coarse distinct yellowish brown (10YR 5/6) mottles and few medium and coarse prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine and medium snail shells; slight effervescence; mildly alkaline.

The A horizon ranges from 4 to 10 inches in thickness. The depth to carbonates ranges from 0 to 9 inches.

The Ap or A horizon has value of 3 to 5 and chroma of 2 to 6. The C horizon has value of 4 to 7 and chroma of 2 to 8.

Comfrey Series

The Comfrey series consists of poorly drained and very poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Comfrey soils are similar to Ambraw and Sawmill soils and commonly are adjacent to Ambraw, Medway, and Sawmill soils. Ambraw and Medway soils have a thinner mollic epipedon. Ambraw soils are in positions similar to those of the Comfrey soils. The Medway soils are in slightly higher positions and are moderately well drained. Sawmill soils are fine-silty and are in positions similar to those of the Comfrey soils.

Typical pedon of Comfrey clay loam, frequently flooded; 322 feet south and 2,164 feet east of the northwest corner of sec. 5, T. 18 N., R. 10 W.

Ap—0 to 7 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; clear smooth boundary.

A1—7 to 15 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; neutral; clear smooth boundary.

A2—15 to 30 inches; mottled black (10YR 2/1) and very dark gray (10YR 3/1) clay loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

Bg1—30 to 36 inches; mottled very dark gray (10YR 3/1) and dark grayish brown (2.5Y 4/2) clay loam; weak medium subangular blocky structure; firm; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; few fine dark stains (iron and manganese oxides); less than 2 percent fine and medium gravel; neutral; clear smooth boundary.

Bg2—36 to 46 inches; dark gray (10YR 4/1) clay loam; few fine distinct strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine and medium dark concretions and stains (iron and manganese oxides); neutral, gradual smooth boundary.

Cg1—46 to 52 inches; mottled dark grayish brown (2.5Y 4/2), grayish brown (2.5Y 5/2), and strong brown (7.5YR 5/6) loam; massive; friable; few fine and medium dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

Cg2—52 to 60 inches; grayish brown (2.5Y 5/2) and dark grayish brown (2.5Y 4/2) loam; many medium and coarse prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine and medium dark concretions and stains (iron and manganese oxides); neutral.

The solum ranges from 30 to 50 inches in thickness. The mollic epipedon ranges from 24 to 36 inches in thickness.

The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 1; or it is neutral and has value of 2 or 3. It is clay loam or loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 1 or 2. It is clay loam or loam. The Cg horizon is loam or

clay loam. Strata of coarser textures are in some pedons.

Darwin Series

The Darwin series consists of poorly drained, very slowly permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Darwin soils commonly are adjacent to Ambraw and Beaucoup soils. Ambraw and Beaucoup soils are slightly higher on flood plains than the Darwin soils. Ambraw soils are fine-loamy, and Beaucoup soils are fine-silty.

Typical pedon of Darwin silty clay; 1,740 feet south and 1,380 feet west of the northeast corner of sec. 14, T. 17 N., R. 13 W.

Ap—0 to 12 inches; very dark gray (10YR 3/1) silty clay, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to weak very fine and fine granular; firm; few very fine roots; neutral; abrupt smooth boundary.

A—12 to 21 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; common fine and medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine and medium subangular blocky structure; firm; few very fine roots; few fine dark stains (iron and manganese oxides); neutral; clear smooth boundary.

Bg1—21 to 40 inches; dark gray (10YR 4/1) silty clay; many fine and medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; few faint very dark gray (10YR 3/1) pressure faces on exterior of peds; few fine dark stains (iron and manganese oxides); neutral; gradual smooth boundary.

Bg2—40 to 53 inches; grayish brown (2.5Y 5/2) silty clay; many medium and coarse prominent yellowish brown (10YR 5/4) mottles; weak fine and medium subangular blocky structure; firm; few faint gray (10YR 5/1) pressure faces on exterior of peds; few fine dark stains (iron and manganese oxides); neutral; clear smooth boundary.

Cg—53 to 60 inches; mottled dark gray (10YR 4/1), grayish brown (2.5Y 5/2), and yellowish brown (10YR 5/6) silty clay loam; massive; firm; few fine dark stains (iron and manganese oxides); neutral.

The solum ranges from 40 to 60 inches in thickness. The mollic epipedon ranges from 15 to 24 inches in thickness.

The Ap or A horizon has value of 2 or 3. The Bg horizon has value of 4 to 6.

Dickinson Series

The Dickinson series consists of well drained soils on stream terraces. They are moderately rapidly permeable in the upper part of the profile and rapidly permeable in the lower part. These soils formed in loamy and sandy material. Slope ranges from 1 to 5 percent.

Dickinson soils commonly are adjacent to Ambraw, Orio, Raddle, and Sparta soils. The Ambraw and Orio soils are poorly drained and fine-loamy. Ambraw soils are on flood plains, and Orio soils are in shallow depressions. Raddle soils are fine-silty and are slightly lower on terraces than the Dickinson soils. Sparta soils are sandy and excessively drained. They are slightly higher on terraces than the Dickinson soils.

Typical pedon of Dickinson fine sandy loam, 1 to 5 percent slopes; 90 feet south and 450 feet east of the northwest corner of sec. 36, T. 17 W., R. 13 W.

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark brown (10YR 4/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; medium acid; clear smooth boundary.

A—12 to 20 inches; dark brown (10YR 3/3) fine sandy loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; gradual smooth boundary.

Bw1—20 to 28 inches; brown (10YR 4/3) sandy loam; weak fine and medium subangular blocky structure; friable; few very fine roots; many faint dark brown (10YR 3/3) organic coatings on faces of peds; medium acid; gradual smooth boundary.

Bw2—28 to 38 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) coatings on faces of peds; medium acid; clear smooth boundary.

BC—38 to 48 inches; brown (7.5YR 4/4) loamy sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; medium acid; clear smooth boundary.

C—48 to 60 inches; dark yellowish brown (10YR 4/4)

and yellowish brown (10YR 5/4) sand; single grained; loose; medium acid.

The solum ranges from 40 to 50 inches in thickness. The mollic epipedon ranges from 15 to 24 inches in thickness.

The Ap or A horizon has value of 2 or 3. It is fine sandy loam or sandy loam. The Bw horizon has value of 4 or 5. The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is loamy sand or sand.

Dockery Series

The Dockery series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Dockery soils commonly are adjacent to Beaucoup and Ross soils. Beaucoup soils are slightly lower on flood plains than the Dockery soils and are poorly drained. Ross soils are fine-loamy. They are higher on the flood plain and are well drained.

Typical pedon of Dockery silt loam, frequently flooded; 1,305 feet north and 2,280 feet west of the southeast corner of sec. 11, T. 17 W., R. 13 W.

A—0 to 8 inches; stratified dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and brown (10YR 5/3) silt loam, brown (10YR 5/3) dry; common fine and medium distinct brown (7.5YR 4/4) mottles; massive; friable; few very fine roots; neutral; clear smooth boundary.

C1—8 to 24 inches; stratified dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and brown (10YR 5/3) silt loam; common fine distinct brown (7.5YR 4/4) mottles; massive; friable; few very fine and fine roots; few very dark gray (10YR 3/1) wormcasts; neutral; gradual smooth boundary.

C2—24 to 40 inches; stratified very dark grayish brown (10YR 3/2) and grayish brown (10YR 5/2) silty clay loam; common fine and medium distinct brown (7.5YR 4/4) mottles; massive; friable; few very fine and fine roots; few very dark gray (10YR 3/1) wormcasts; neutral; gradual smooth boundary.

C3—40 to 60 inches; stratified very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2), and grayish brown (10YR 5/2) silty clay loam; common medium distinct brown (7.5YR 4/4) mottles; massive; friable; few very fine roots; few very dark gray (10YR 3/1) wormcasts; neutral.

The Ap or A horizon ranges from 7 to 14 inches in thickness. It has chroma of 2 to 4. The C horizon has chroma of 1 to 3 and is stratified silt loam and silty clay loam.

Elkhart Series

The Elkhart series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 5 to 10 percent.

Elkhart soils are similar to Tama soils and commonly are adjacent to Ipava, Tallula, and Tama soils. Ipava and Tama soils have a thicker solum and are in less sloping positions at a higher elevation than the Elkhart soils. Tallula soils are coarse-silty and are in positions similar to those of the Elkhart soils.

Typical pedon of Elkhart silt loam, 5 to 10 percent slopes, eroded; 210 feet south and 108 feet east of the northwest corner of sec. 6, T. 17 N., R. 8 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; some mixing of dark yellowish brown (10YR 4/4) subsoil material in the lower part; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; abrupt smooth boundary.

Bt1—11 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak very fine and fine subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films and common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—17 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—22 to 34 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral, clear smooth boundary.

C1—34 to 45 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; few very fine roots; few fine concretions (calcium carbonate); slight effervescence; mildly alkaline; clear smooth boundary.

C2—45 to 60 inches; light brownish gray (10YR 6/2) silt loam; many medium and coarse prominent strong brown (7.5YR 5/6) mottles; massive; friable; slight effervescence; mildly alkaline.

The solum thickness and depth to carbonates range from 24 to 35 inches. The mollic epipedon ranges from 10 to 13 inches in thickness.

The Ap horizon has chroma of 2 or 3. The Bt horizon has chroma of 4 to 6. The C horizon has value of 4 to 6 and chroma of 2 to 6.

Fayette Series

The Fayette series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 2 to 30 percent.

Fayette soils are similar to Rozetta, Seaton, and Sylvan soils and commonly are adjacent to Hickory, Keomah, Rozetta, Sylvan, and Timula soils. Hickory, Sylvan, and Timula soils are on side slopes at a lower elevation than the Fayette soils. Hickory soils formed in glacial till, and Sylvan soils have a thinner solum. Timula soils are coarse-silty and do not have an argillic horizon. Keomah and Rozetta soils are on ridges at a higher elevation than the Fayette soils. Keomah soils are somewhat poorly drained, and Rozetta soils are moderately well drained. Seaton soils have less clay in the subsoil than the Fayette soils.

Typical pedon of Fayette silt loam, 2 to 5 percent slopes; 1,435 feet south and 2,130 feet east of the northwest corner of sec. 2, T. 17 N., R. 9 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, very pale brown (10YR 7/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; abrupt smooth boundary.

E—7 to 12 inches; dark yellowish brown (10YR 4/4) silt loam, very pale brown (10YR 7/3) dry; weak medium platy structure parting to weak very fine subangular blocky; friable; few very fine roots; few faint dark brown (10YR 4/3) coatings and distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; medium acid; abrupt smooth boundary.

BE—12 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; weak very fine and fine subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films and distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; medium acid; abrupt smooth boundary.

Bt1—15 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure parting to moderate very fine and fine subangular and angular blocky; firm; few very fine roots; few distinct dark brown (10YR 4/3) clay films and very pale brown (10YR 7/3) dry silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt2—24 to 37 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular and angular blocky; firm; few very fine roots; many distinct dark brown (10YR 4/3) clay films and few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt3—37 to 43 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; many distinct dark yellowish brown (10YR 4/4) and few distinct dark brown (10YR 4/3) clay films and few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt4—43 to 56 inches; yellowish brown (10YR 5/4) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); strongly acid; clear smooth boundary.

BC—56 to 60 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; firm; few faint dark yellowish brown (10YR 4/4) clay films and distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); strongly acid.

The solum ranges from 44 to more than 60 inches in thickness. The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has value of 4 or 5 and chroma of 2 to 4. Some eroded pedons do not have an E horizon. The Bt horizon has chroma of 3 or 4.

Gilford Series

The Gilford series consists of very poorly drained soils on stream terraces. These soils are moderately rapidly permeable in the upper part of the profile and rapidly permeable in the lower part. They formed in loamy and sandy material. Slope ranges from 0 to 2 percent.

Gilford soils commonly are adjacent to Ambraw,

Hoopeston, Orio, Plainfield, and Sparta soils. Ambraw soils are fine-loamy. They are on flood plains and are poorly drained. Hoopeston soils are slightly higher on terraces than the Gilford soils and are somewhat poorly drained. Orio soils have a thinner, dark surface layer. They are in shallow depressions and are poorly drained. Plainfield and Sparta soils are sandy. They are higher on terraces than the Gilford soils and are excessively drained.

Typical pedon of Gilford sandy loam; 2,123 feet south and 325 feet west of the northeast corner of sec. 27, T. 18 N., R. 12 W.

Ap—0 to 10 inches; black (10YR 2/1) sandy loam, very dark grayish brown (10YR 3/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; medium acid; abrupt smooth boundary.

A—10 to 18 inches; very dark grayish brown (10YR 3/2) sandy loam, dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) dry; common fine distinct dark brown (7.5YR 4/4) mottles; weak fine and medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bg1—18 to 26 inches; dark grayish brown (2.5Y 4/2) sandy loam; many medium and coarse prominent strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear wavy boundary.

Bg2—26 to 31 inches; mottled gray (10YR 5/1), dark gray (10YR 4/1), and strong brown (7.5YR 5/6) sandy loam; weak fine and medium subangular blocky structure; very friable; neutral; clear wavy boundary.

2Cg1—31 to 40 inches; dark gray (10YR 4/1) loamy sand; few fine and medium distinct strong brown (7.5YR 5/6) mottles; single grained; very friable; neutral; clear wavy boundary.

2Cg2—40 to 60 inches; mottled light brownish gray (2.5Y 6/2), grayish brown (2.5Y 5/2), and yellowish brown (10YR 5/6) stratified loamy sand and sand; single grained; very friable; neutral.

The solum ranges from 28 to 40 inches in thickness. The mollic epipedon ranges from 11 to 22 inches in thickness.

The Bg horizon has value of 4 to 6.

Hamburg Series

The Hamburg series consists of somewhat excessively drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 20 to 60 percent.

Hamburg soils are similar to Bold soils and commonly are adjacent to Fayette, Hickory, Seaton, and Timula soils. These soils are well drained and have a higher content of clay below the surface layer than the Hamburg soils. Fayette soils are on side slopes and ridges at a higher elevation then the Hamburg soils. Hickory soils formed in glacial till and are on side slopes at a lower elevation than the Hamburg soils. Seaton and Timula soils are in positions similar to those of the Hamburg soils.

Typical pedon of Hamburg silt loam, 35 to 60 percent slopes; 450 feet north and 810 feet west of the center of sec. 5, T. 18 N., R. 9 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine and medium granular structure; friable; common very fine roots; strong effervescence; moderately alkaline; abrupt smooth boundary.

C1—7 to 11 inches; brown (10YR 4/3) silt loam; massive; friable; common very fine roots; violent effervescence; moderately alkaline; clear smooth boundary.

C2—11 to 39 inches; yellowish brown (10YR 5/4) silt; massive; friable; few very fine roots; violent effervescence; moderately alkaline; gradual smooth boundary.

C3—39 to 60 inches; light yellowish brown (10YR 6/4) silt; massive; friable; few very fine roots; violent effervescence; moderately alkaline.

The A horizon ranges from 5 to 15 inches in thickness. The depth to carbonates ranges from 0 to 10 inches.

The A horizon has value of 3 or 4 and chroma of 2 or 3. The C horizon is silt loam, silt, and very fine sandy loam.

Hartsburg Series

The Hartsburg series consists of poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Hartsburg soils are similar to Sable soils and commonly are adjacent to Ipava, Sable, and Tama soils. Ipava, Sable, and Tama soils do not have

carbonates within a depth of 40 inches. Ipava and Tama soils are on ridges above the Hartsburg soils. Ipava soils are fine textured and somewhat poorly drained, and Tama soils are moderately well drained and well drained. Sable soils are slightly higher on the landscape than the Hartsburg soils.

Typical pedon of Hartsburg silty clay loam; 1,296 feet south and 354 feet west of the center of sec. 9, T. 17 N., R. 9 W.

Ap—0 to 6 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A—6 to 13 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine angular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

BA—13 to 17 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; few very fine roots; mildly alkaline; clear smooth boundary.

Bg1—17 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct brown (10YR 4/3) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions (calcium carbonate); slight effervescence; mildly alkaline; clear smooth boundary.

Bg2—21 to 27 inches; mottled dark grayish brown (2.5Y 4/2), olive brown (2.5Y 4/4), and strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions (calcium carbonate); slight effervescence; mildly alkaline; clear smooth boundary.

Bg3—27 to 34 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles and few fine distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common faint dark grayish brown (2.5Y 4/2) coatings on faces of peds; common distinct very dark grayish brown (10YR 3/2) organic coatings in root channels; few fine concretions (calcium carbonate); strong effervescence; mildly alkaline; clear smooth boundary.

BCg—34 to 40 inches; grayish brown (2.5Y 5/2) silt loam; many fine and medium prominent yellowish brown (10YR 5/4 and 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common faint dark grayish brown (10YR 4/2) coatings on faces of peds; few fine concretions (calcium carbonate); violent effervescence; mildly alkaline; clear smooth boundary.

Cg—40 to 60 inches; grayish brown (2.5Y 5/2) silt loam; many medium and coarse prominent yellowish brown (10YR 5/6 and 5/8) mottles; massive with some distinct vertical cleavage; friable; few faint dark grayish brown (10YR 4/2) coatings on cleavage planes; few fine concretions (calcium carbonate); violent effervescence; moderately alkaline.

The solum ranges from 30 to 40 inches in thickness. The depth to carbonates ranges from 17 to 35 inches. The mollic epipedon ranges from 12 to 20 inches in thickness.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1; or they are neutral and have value of 2 or 3. The Bg horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 or 2.

Hickory Series

The Hickory series consists of well drained, moderately permeable soils on uplands. These soils formed in loamy glacial till. Slope ranges from 15 to 60 percent.

Hickory soils are similar to Alvin soils and commonly are adjacent to Arenzville, Fayette, Rozetta, and Seaton soils. Alvin soils are coarse-loamy. Arenzville soils are on flood plains and are moderately well drained. Fayette, Rozetta, and Seaton soils formed in loess and are on ridges and side slopes at a higher elevation than the Hickory soils.

Typical pedon of Hickory loam, 30 to 60 percent slopes; 1,935 feet north and 2,130 feet west of the southeast corner of sec. 27, T. 18 N., R. 9 W.

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

A2—1 to 4 inches; mixed dark grayish brown (10YR 4/2) and brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure parting to weak fine granular; friable; many very fine

roots; medium acid; abrupt smooth boundary.

E1—4 to 8 inches; mixed brown (10YR 5/3) and dark grayish brown (10YR 4/2) loam, light gray (10YR 7/2) dry; moderate thin platy structure; friable; few very fine and fine roots; common prominent white (10YR 8/2) dry silt coatings on faces of peds; 3 percent, by volume, thin gravel; strongly acid; abrupt smooth boundary.

E2—8 to 12 inches; yellowish brown (10YR 5/4) loam, light gray (10YR 7/2) dry; moderate very fine and fine subangular blocky structure; friable; few very fine roots; few faint brown (10YR 5/3) coatings and prominent white (10YR 8/2) dry silt coatings on faces of peds; few fine dark grayish brown (10YR 4/2) root channel fillings; 3 percent, by volume, fine and medium gravel; strongly acid; clear smooth boundary.

Bt1—12 to 22 inches; yellowish brown (10YR 5/4) clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; 5 percent, by volume, fine and medium gravel; very strongly acid; clear smooth boundary.

Bt2—22 to 29 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine and fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; 5 percent, by volume, fine gravel; strongly acid; clear smooth boundary.

Bt3—29 to 40 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct brown (7.5YR 4/4) clay films on faces of peds; 5 percent, by volume, fine gravel; medium acid; gradual smooth boundary.

Bt4—40 to 53 inches; yellowish brown (10YR 5/6) clay loam; weak medium prismatic structure parting to weak medium and coarse subangular blocky; firm; few very fine roots; many distinct dark yellowish brown (10YR 4/4) and distinct brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); 5 percent, by volume, fine gravel; medium acid; clear smooth boundary.

BC—53 to 60 inches; yellowish brown (10YR 5/6) and brown (10YR 5/3) loam; weak medium prismatic structure parting to weak medium and coarse subangular blocky; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) and few distinct brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); 5 percent, by volume, fine and medium gravel; neutral.

The solum ranges from 42 to more than 60 inches in thickness.

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

Hoopeston Series

The Hoopeston series consists of somewhat poorly drained soils on stream terraces. These soils are moderately rapidly permeable in the upper part of the profile and rapidly permeable in the lower part. They formed in loamy and sandy material. Slope ranges from 0 to 2 percent.

Hoopeston soils are similar to Watseka soils and commonly are adjacent to Dickinson, Gilford, Orio, Sparta, and Watseka soils. Dickinson soils are higher on terraces than the Hoopeston soils and are well drained. Gilford and Orio soils are lower on terraces. Gilford soils are very poorly drained, and Orio soils are poorly drained. Sparta and Watseka soils are sandy throughout. Sparta soils are higher on stream terraces than those of Hoopeston soils and are excessively drained. Watseka soils are in positions similar to those of Hoopeston soils.

Typical pedon of Hoopeston sandy loam; 195 feet south and 985 feet east of the northwest corner of sec. 36, T. 17 N., R. 13 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; strongly acid; clear smooth boundary.

A—8 to 13 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak fine and medium granular; friable; few very fine roots; strongly acid; clear smooth boundary.

BA—13 to 18 inches; dark brown (10YR 4/3) sandy loam; few fine faint dark grayish brown (10YR 4/2) mottles; weak fine and medium subangular blocky structure parting to weak fine granular; very friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark brown (7.5YR 4/4) stains (iron

and manganese oxides); medium acid; clear smooth boundary.

Bw1—18 to 26 inches; brown (10YR 5/3) sandy loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 4/3) and dark grayish brown (10YR 4/2) coatings on faces of peds; common fine and medium dark brown (7.5YR 4/4) concretions and stains (iron and manganese oxides); medium acid; clear smooth boundary.

Bw2—26 to 36 inches; brown (10YR 5/3) sandy loam; few fine faint grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) coatings on faces of peds; common fine and medium dark brown (7.5YR 4/4) concretions and stains (iron and manganese oxides); medium acid; clear smooth boundary.

BC—36 to 41 inches; mottled yellowish brown (10YR 5/4) and pale brown (10YR 6/3) loamy sand; weak fine and medium subangular blocky structure; loose; few fine dark brown (7.5YR 4/4) concretions and stains (iron and manganese oxides); medium acid; clear smooth boundary.

C—41 to 60 inches; mottled pale brown (10YR 6/3) and yellowish brown (10YR 5/4) sand, few thin bands of loamy sand; single grained; loose; few fine dark brown (7.5YR 4/4) stains (iron and manganese oxides); slightly acid.

The solum ranges from 33 to 45 inches in thickness. The mollic epipedon ranges from 12 to 18 inches in thickness.

The Ap or A horizon has value of 2 or 3. The Bw horizon has value of 4 or 5 and chroma of 2 to 4. The C horizon is sand and loamy sand.

Ipava Series

The Ipava series consists of somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 5 percent.

Ipava soils commonly are adjacent to Elkhart, Hartsburg, Sable, Tallula, and Tama soils. Elkhart and Tallula soils are on side slopes at a lower elevation than the Ipava soils and are well drained. Hartsburg and Sable soils are poorly drained and do not have an argillic horizon. They are in positions slightly lower than those of the Ipava soils. Tama soils are on side slopes at a lower elevation than the Ipava soils, or they are on rises at a higher elevation. Tama soils are moderately well drained and well drained.

Typical pedon of Ipava silt loam, 0 to 2 percent slopes; 242 feet south and 74 feet east of the center of sec. 3, T. 17 N., R. 9 W.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, gray (10YR 5/1) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; slightly acid; clear smooth boundary.

A—10 to 21 inches, very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2) silty clay loam, gray (10YR 5/1) dry; moderate very fine and fine subangular blocky structure; firm; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BA—21 to 25 inches; mottled brown (10YR 4/3), dark grayish brown (10YR 4/2), and yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; fine dark stains (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt1—25 to 32 inches; mottled brown (10YR 5/3), grayish brown (10YR 5/2), yellowish brown (10YR 5/8), and light brownish gray (10YR 6/2) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films and very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt2—32 to 39 inches; mottled light brownish gray (10YR 6/2), light yellowish brown (2.5Y 6/4), yellowish brown (10YR 5/8), and strong brown (7.5YR 4/6) silty clay loam; weak medium subangular blocky structure; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common distinct very dark grayish brown (10YR 3/2) organic coatings in root channels; few fine dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

Bt3—39 to 45 inches; mottled light yellowish brown (2.5Y 6/4), light brownish gray (2.5Y 6/2), strong brown (7.5YR 4/6), and yellowish brown (10YR 5/8) silty clay loam; weak medium subangular blocky

structure; firm; few very fine roots; few distinct grayish brown (10YR 5/2) clay films on faces of peds; common distinct very dark grayish brown (10YR 3/2) organic coatings in root channels; common medium very dark gray (10YR 3/1) wormcasts; few fine dark stains (iron and manganese oxides); neutral; clear smooth boundary.

BCg—45 to 52 inches; mottled light brownish gray (2.5Y 6/2), light yellowish brown (2.5Y 6/4), brownish yellow (10YR 6/6), and strong brown (7.5YR 4/6) silt loam; weak medium and coarse subangular blocky structure; firm; few medium very dark gray (10YR 3/1) wormcasts; few fine dark stains (iron and manganese oxides); mildly alkaline; gradual smooth boundary.

Cg—52 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; few medium and coarse distinct brownish yellow (10YR 6/6) mottles and few medium prominent strong brown (7.5YR 4/6) mottles; massive; friable; slight effervescence; mildly alkaline.

The solum ranges from 42 to 53 inches in thickness. The mollic epipedon ranges from 14 to 23 inches in thickness. The Ap and A horizons are silt loam or silty clay loam.

Keomah Series

The Keomah series consists of somewhat poorly drained, moderately slowly permeable to slowly permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 3 percent.

Keomah soils commonly are adjacent to Fayette, Ipava, Rozetta, and Sylvan soils. Fayette, Sylvan, and Rozetta soils are on side slopes at a lower elevation than the Keomah soils and on narrow ridgetops at a higher elevation. Fayette and Sylvan soils are well drained, and Rozetta soils are moderately well drained. Ipava soils have a mollic epipedon and are farther from drainageways in positions similar to those of the Keomah soils.

Typical pedon of Keomah silt loam, 0 to 3 percent slopes; 1,005 feet south and 178 feet west of the center of sec. 25, T. 18 N., R. 10 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; medium acid; abrupt smooth boundary.

E—8 to 12 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; few fine distinct yellowish brown (10YR 5/4) mottles; weak medium platy structure parting to weak fine subangular blocky; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) coatings and common prominent white (10YR 8/1) dry silt coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); slightly acid; abrupt smooth boundary.

EB—12 to 14 inches; brown (10YR 5/3) silt loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate very fine and fine angular blocky structure; friable; few very fine roots; common faint grayish brown (10YR 5/2) coatings and common prominent white (10YR 8/1) dry silt coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); medium acid; abrupt smooth boundary.

Bt1—14 to 18 inches; brown (10YR 5/3) silty clay loam; few fine faint yellowish brown (10YR 5/4) mottles; moderate very fine and fine subangular blocky structure; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films and few prominent white (10YR 8/1) dry silt coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt2—18 to 29 inches; mottled grayish brown (10YR 5/2), pale brown (10YR 6/3), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; common distinct grayish brown (2.5Y 5/2) clay films and few prominent white (10YR 8/1) dry silt coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt3—29 to 36 inches; mottled brown (10YR 5/3), light brownish gray (10YR 6/2), and yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; few distinct grayish brown (10YR 5/2) clay films on faces of peds; common distinct dark grayish brown (10YR 4/2) clay films in root channels; few fine dark concretions and stains (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt4—36 to 52 inches; grayish brown (10YR 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm;

few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct dark grayish brown (10YR 4/2) clay films in root channels; common fine dark stains (iron and manganese oxides); slightly acid; clear smooth boundary.

BC—52 to 60 inches; grayish brown (10YR 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark stains (iron and manganese oxides); slightly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap or A horizon has chroma of 1 or 2. The E horizon has value of 4 or 5. The Bt horizon has value of 4 or 5 and chroma of 2 to 4.

Landes Series

The Landes series consists of well drained soils on flood plains. These soils are moderately rapidly permeable in the upper part of the profile and rapidly permeable in the lower part. They formed in loamy and sandy alluvium. Slope ranges from 0 to 3 percent.

Landes soils commonly are adjacent to Ambraw, Beaucoup, and Medway soils. Ambraw, Beaucoup, and Medway soils are lower on flood plains than the Landes soils. Ambraw and Beaucoup are poorly drained, and Medway soils are moderately well drained.

Typical pedon of Landes fine sandy loam, frequently flooded, 0 to 3 percent slopes; 99 feet south and 1,110 feet west of the northeast corner of sec. 4, T. 18 N., R. 11 W.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark brown (10YR 4/3) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

A—5 to 14 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

BA—14 to 19 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw1—19 to 23 inches; brown (10YR 4/3) loam; weak fine and medium subangular blocky structure; friable; few very fine roots; many faint dark brown (10YR 3/3) and few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw2—23 to 28 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 3/3) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw3—28 to 32 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; common faint dark brown (10YR 3/3) organic coatings on faces of peds; less than 2 percent, by volume, fine gravel; neutral; clear smooth boundary.

BC—32 to 36 inches; dark yellowish brown (10YR 4/4) and brown (10YR 4/3) loamy sand; weak medium subangular blocky structure; very friable; few very fine roots; 5 percent, by volume, fine gravel; neutral; clear smooth boundary.

C—36 to 60 inches; yellowish brown (10YR 5/4) sand; single grained; loose; 2 percent, by volume, fine gravel; neutral.

The solum ranges from 32 to 40 inches in thickness. The mollic epipedon ranges from 15 to 22 inches in thickness.

The Ap and A horizons have chroma of 1 or 2. The Bw horizon is fine sandy loam, sandy loam, or loam. The C horizon is sand, loamy sand, or sandy loam and is stratified in some pedons.

Lawson Series

The Lawson series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Lawson soils commonly are adjacent to Arenzville, Radford, and Sawmill soils. Arenzville and Radford soils have a dark color buried soil within a depth of 40 inches and are in positions similar to those of the Lawson soils. Sawmill soils are lower on flood plains than the Lawson soils and are poorly drained.

Typical pedon of Lawson silt loam, frequently flooded; 840 feet north and 1,395 feet west of the southeast corner of sec. 18, T. 19 N., R. 8 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam,

grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure parting to weak fine and medium granular; friable; few very fine roots; slightly acid; abrupt smooth boundary.

A—9 to 27 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

C1—27 to 42 inches; very dark grayish brown (10YR 3/2) silt loam; few medium faint dark yellowish brown (10YR 3/4) mottles; massive; friable; few very fine roots; neutral; gradual smooth boundary.

C2—42 to 60 inches; very dark gray (10YR 3/1) silt loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; mildly alkaline.

The solum and the mollic epipedon range from 24 to 32 inches in thickness. The Ap and A horizons have value of 2 or 3. The C horizon has value of 3 to 6 and chroma of 1 to 3. It is silt loam or silty clay loam and has loam strata in some pedons.

Littleton Series

The Littleton series consists of somewhat poorly drained, moderately permeable soils on alluvial fans and stream terraces. These soils formed in silty alluvium. Slope ranges from 0 to 2 percent.

Littleton soils commonly are adjacent to Arenzville, Raddle, and Worthen soils. Arenzville soils are on flood plains and are moderately well drained. Raddle and Worthen soils are higher on terraces than the Littleton soils and are well drained.

Typical pedon of Littleton silt loam, 390 feet north and 1,590 feet east of the southwest corner of sec. 32, T. 18 N., R. 11 W.

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

A—10 to 26 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine and fine subangular blocky structure; friable; few very fine roots; slightly acid; clear smooth boundary.

AB—26 to 36 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; few fine faint dark brown (10YR 4/3) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bw—36 to 44 inches; mottled dark grayish brown (10YR 4/2), dark brown (10YR 4/3), and yellowish brown (10YR 5/6) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

BC—44 to 60 inches; mottled dark brown (10YR 4/3), dark grayish brown (10YR 4/2), and yellowish brown (10YR 5/6) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral.

The solum ranges from 35 to more than 60 inches in thickness. The mollic epipedon ranges from 24 to 36 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bw horizon has value of 3 to 5.

Medway Series

The Medway series consists of moderately well drained soils on flood plains. These soils are moderately permeable in the upper part of the profile and moderately or moderately rapidly permeable in the lower part. They formed in alluvium. Slope ranges from 0 to 2 percent.

Medway soils commonly are adjacent to Ambraw, Beaucoup, Landes, and Tice soils. Ambraw, Beaucoup, and Tice soils are lower on flood plains than the Medway soils. Ambraw and Beaucoup soils are poorly drained, and Tice soils are somewhat poorly drained. Landes soils are higher on flood plains and are well drained.

Typical pedon of Medway loam, frequently flooded; 1,710 feet north and 210 feet east of the southwest corner of sec. 2, T. 18 N., R. 11 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

A—9 to 15 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few

very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw1—15 to 23 inches; dark brown (10YR 4/3) loam; few fine distinct brown (7.5YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) coatings and common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bw2—23 to 28 inches; brown (10YR 5/3) loam; few fine distinct brown (7.5YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); neutral; gradual smooth boundary.

Bw3—28 to 38 inches; yellowish brown (10YR 5/4) loam; few fine and medium faint grayish brown (10YR 5/2) mottles and few fine distinct brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

BC—38 to 49 inches; yellowish brown (10YR 5/4) fine sandy loam; common fine and medium distinct brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; few fine dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

C—49 to 60 inches; yellowish brown (10YR 5/4) loamy sand; single grained; very friable; few grayish brown (10YR 5/2) krotovina; neutral.

The solum ranges from 40 to 54 inches in thickness. The mollic epipedon ranges from 12 to 23 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 to 3. The Bw horizon has chroma of 2 to 4. The C horizon has value of 4 or 5 and chroma of 2 to 6. It is loam, silt loam, silty clay loam, sandy loam, or loamy sand and is stratified in some pedons.

Orio Series

The Orio series consists of deep, poorly drained, moderately slowly permeable soils on stream terraces and uplands. These soils formed in loamy and sandy material. Slope ranges from 0 to 2 percent.

Orio soils are similar to Beardstown soils and commonly are adjacent to Beardstown, Hoopeston, Plainfield, and Sparta soils. Beardstown and Hoopeston soils are slightly higher on stream terraces than Orio soils and are somewhat poorly drained. Plainfield and Sparta soils are higher on terraces than the Orio soils and are sandy and excessively drained.

Typical pedon of Orio loam; 2,068 feet north and 1,400 feet east of the southwest corner of sec. 28, T. 18 N., R. 12 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; abrupt smooth boundary.

E1—9 to 15 inches; grayish brown (2.5Y 5/2) loamy sand, light gray (10YR 7/2) dry; common medium faint light brownish gray (2.5Y 6/2) mottles and few fine prominent strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure parting to weak medium platy; friable; few very fine roots; neutral; clear smooth boundary.

E2—15 to 22 inches; mottled light brownish gray (2.5Y 6/2), grayish brown (2.5Y 5/2), strong brown (7.5YR 4/6), and yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.

Btg1—22 to 35 inches; mottled gray (10YR 5/1), light gray (10YR 6/1), and yellowish brown (10YR 5/8) sandy clay loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; common faint gray (10YR 5/1) and few distinct dark gray (10YR 4/1) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg2—35 to 45 inches; mottled gray (10YR 5/1), light gray (10YR 6/1), and yellowish brown (10YR 5/8) sandy clay loam; weak medium and coarse subangular blocky structure; firm; few distinct dark gray (10YR 4/1) and faint gray (10YR 5/1) clay films on faces of peds; medium acid; clear smooth boundary.

Cg—45 to 60 inches; dark gray (10YR 4/1) stratified sandy loam and loam and light brownish gray (10YR 6/2) loamy sand; few medium and coarse prominent strong brown (7.5YR 4/6) mottles; massive; friable; neutral.

The solum ranges from 39 to 60 inches in thickness. The Ap or A horizon has value of 2 or 3 and chroma of

1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is loam, fine sandy loam, sandy loam, or loamy sand. The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is sandy clay loam, clay loam, loam, or sandy loam.

Plainfield Series

The Plainfield series consists of excessively drained, rapidly permeable soils on stream terraces and uplands. These soils formed in sandy material. Slope ranges from 1 to 30 percent.

Plainfield soils are similar to Bloomfield soils and commonly are adjacent to Bloomfield, Gilford, and Sparta soils. Bloomfield and Sparta soils are in positions similar to those of the Plainfield soils. Bloomfield soils are somewhat excessively drained and have an argillic horizon. Sparta and Gilford soils have a mollic epipedon. Gilford soils are lower on terraces and are very poorly drained.

Typical pedon of Plainfield sand, 1 to 7 percent slopes; 1,048 feet north and 320 feet west of the southeast corner of sec. 35, T. 18 N., R. 12 W.

Ap—0 to 8 inches; dark brown (10YR 3/3) sand, pale brown (10YR 6/3) dry; weak medium subangular blocky structure parting to weak fine granular; very friable; few very fine roots; medium acid; abrupt smooth boundary.

Bw1—8 to 16 inches; dark yellowish brown (10YR 4/4) sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; common faint dark brown (10YR 4/3) coatings on faces of peds; medium acid; clear smooth boundary.

Bw2—16 to 32 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; common faint dark brown (10YR 4/3) coatings on faces of peds; medium acid; clear smooth boundary.

C1—32 to 45 inches; yellowish brown (10YR 5/4) sand; single grained; loose; few very fine roots; strongly acid; clear smooth boundary.

C2—45 to 60 inches; yellowish brown (10YR 5/6) sand; single grained; loose; strongly acid.

The solum ranges from 22 to 34 inches in thickness. The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The Bw horizon has chroma of 4 to 6.

Raddle Series

The Raddle series consists of well drained, moderately permeable soils on alluvial fans, foot slopes, and stream terraces. These soils formed in alluvium or colluvium. Slope ranges from 2 to 10 percent.

Raddle soils are similar to Worthen soils and commonly are adjacent to Littleton and Worthen soils. Littleton soils are in positions slightly lower than those of the Raddle soils and are somewhat poorly drained. Worthen soils are in nearly level areas at a lower elevation than the Raddle soils. Littleton and Worthen soils have a thicker mollic epipedon.

Typical pedon of Raddle silt loam, 2 to 5 percent slopes; 1,200 feet south and 195 feet east of the northwest corner of sec. 35, T. 19 N., R. 9 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; neutral; clear smooth boundary.

A—11 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to weak fine and medium granular; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings and few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; neutral; clear smooth boundary.

BA—16 to 22 inches; dark brown (10YR 4/3 and 3/3) silt loam; weak fine and medium subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings and few distinct very pale brown (10YR 7/3) dry silt coatings on faces of peds; neutral; clear smooth boundary.

Bw1—22 to 27 inches; dark brown (10YR 4/3) silt loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 3/3) and few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw2—27 to 36 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 4/3 and 3/3) coatings on faces of peds; neutral, gradual smooth boundary.

Bw3—36 to 52 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; common faint dark

brown (10YR 4/3) coatings on faces of peds; slightly acid, gradual smooth boundary.

BC—52 to 60 inches; yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; few faint brown (10YR 4/3) coatings on faces of peds; medium acid.

The solum ranges from 45 to more than 60 inches in thickness. The mollic epipedon ranges from 15 to 24 inches in thickness.

The Ap and A horizons have chroma of 1 to 3. The Bw horizon has value of 3 to 5.

Radford Series

The Radford series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Radford soils commonly are adjacent to Arenzville, Bold, Hickory, and Tallula soils. Arenzville soils are in positions similar to those of the Radford soils, are moderately well drained, and do not have a mollic epipedon. Bold, Hickory, and Tallula soils are on side slopes of uplands and are well drained.

Typical pedon of Radford silt loam, frequently flooded; 1,470 feet north and 60 feet east of the center of sec. 2, T. 17 N., R. 9 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to moderate fine and medium granular; friable; few very fine roots; neutral; clear smooth boundary.

A—7 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

C—12 to 33 inches; mottled and stratified dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), grayish brown (10YR 5/2), and brown (10YR 5/3) silt loam; massive; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings in worm channels; neutral; clear smooth boundary.

Ab1—33 to 42 inches; very dark gray (10YR 3/1) silt loam; weak medium subangular blocky structure parting to moderate medium granular; friable; few very fine roots; mildly alkaline; gradual smooth boundary.

Ab2—42 to 60 inches; very dark gray (10YR 3/1) silt loam; common fine distinct dark brown (7.5YR 4/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few distinct light gray (10YR 6/1) dry silt coatings on faces of peds; mildly alkaline.

The mollic epipedon ranges from 10 to 22 inches in thickness. The depth to the Ab horizon ranges from 24 to 40 inches.

The Ap or A horizon has chroma of 1 or 2. The C horizon has chroma of 1 to 3. The Ab horizon has value of 2 or 3 and is silty clay loam or silt loam.

Ross Series

The Ross series consists of well drained soils on flood plains. These soils are moderately permeable in the upper part of the profile and moderately rapidly permeable or moderately permeable in the lower part. They formed in alluvium. Slope ranges from 0 to 3 percent.

Ross soils commonly are adjacent to Beaucoup and Dockery soils. The poorly drained Beaucoup and somewhat poorly drained Dockery soils are lower on flood plains than the Ross soils. Beaucoup soils are poorly drained, and Dockery soils are somewhat poorly drained.

Typical pedon of Ross loam, frequently flooded, 0 to 3 percent slopes; 390 feet south and 360 feet west of the northeast corner of sec. 33, T. 17 N., R. 13 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; few very fine and fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A1—9 to 22 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine and fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

A2—22 to 29 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw1—29 to 38 inches; dark brown (10YR 4/3) loam;

weak medium subangular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw2—38 to 45 inches; dark brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid, gradual smooth boundary.

Bw3—45 to 53 inches; dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; common faint dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BC—53 to 60 inches; yellowish brown (10YR 5/4) loamy sand; weak medium subangular blocky structure; very friable; slightly acid.

The solum ranges from 50 to more than 60 inches in thickness. The mollic epipedon ranges from 24 to 36 inches in thickness.

The Ap or A horizon has chroma of 1 or 2. The Bw horizon has value and chroma of 3 or 4.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 5 percent.

Rozetta soils are similar to Fayette, Seaton, and Sylvan soils and commonly are adjacent to Fayette, Hickory, Keomah, Sylvan, and Timula soils. The well drained Fayette, Hickory, Seaton, Sylvan, and Timula soils are on side slopes at a lower elevation than the Rozetta soils. Hickory soils are fine-loamy, and Sylvan soils have a thinner solum. Keomah soils are in less sloping areas than those of the Rozetta soils and are fine textured and somewhat poorly drained.

Typical pedon of Rozetta silt loam, 0 to 2 percent slopes; 75 feet south and 2,020 feet east of the northwest corner of sec. 28, T. 18 N., R. 10 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few very fine roots; strongly acid; clear smooth boundary.

E—10 to 15 inches; dark brown (10YR 4/3) silt loam, very pale brown (10YR 7/3) dry; moderate fine subangular blocky structure; friable; few very fine roots; many faint dark grayish brown (10YR 4/2) coatings and common distinct very pale brown (10YR 8/3) dry silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—15 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine angular and subangular blocky structure; firm; few very fine roots; many distinct dark brown (10YR 4/3) clay films and few distinct very pale brown (10YR 8/3) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt2—22 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and few distinct very pale brown (10YR 8/3) dry silt coatings on faces of peds; common fine dark stains (iron and manganese oxides); medium acid; gradual smooth boundary.

Bt3—33 to 45 inches; yellowish brown (10YR 5/4) silt loam; common fine prominent strong brown (7.5YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct very pale brown (10YR 8/3) dry silt coatings on faces of peds; common fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

BC—45 to 50 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct light brownish gray (10YR 6/2) mottles and common fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few distinct very pale brown (10YR 8/3) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

C—50 to 60 inches; mottled brown (10YR 5/3), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/6) silt loam; massive; friable; few fine dark stains (iron and manganese oxides); neutral.

The solum ranges from 45 to more than 60 inches in thickness. The Ap or A horizon has value of 3 to 5 and chroma of 2 or 3. The E horizon has value of 4 or 5. The Bt horizon has chroma of 3 to 6.

Sable Series

The Sable series consists of poorly drained,

moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Sable soils are similar to Hartsburg soils and commonly are adjacent to Hartsburg, Ipava, and Tama soils. Hartsburg soils have carbonates within a depth of 35 inches and are in positions slightly lower than those of the Sable soils. Ipava and Tama soils are in positions higher than those of the Sable soils. Ipava soils are somewhat poorly drained, and Tama soils are moderately well drained and well drained.

Typical pedon of Sable silty clay loam, 66 feet north and 492 feet east of the center of sec. 17, T. 17 N., R. 10 W.

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; firm; few very fine roots; neutral; abrupt smooth boundary.

A—6 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; firm; few very fine roots; neutral; clear smooth boundary.

AB—13 to 19 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; few fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; few fine dark stains (iron and manganese oxides); neutral; clear smooth boundary.

Bg—19 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark stains (iron and manganese oxides); neutral; clear smooth boundary.

Btg1—23 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine faint light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many faint dark grayish brown (2.5Y 4/2) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

Btg2—29 to 38 inches; mottled grayish brown (2.5Y 5/2), light olive brown (2.5Y 5/4), and yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint dark grayish brown (2.5Y 4/2) and few faint dark gray (10YR 4/1) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

Btg3—38 to 44 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium and coarse prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; few faint grayish brown (2.5Y 5/2) clay films on faces of peds; few distinct dark gray (10YR 4/1) clay films in root channels; few fine dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

BCg—44 to 50 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure; friable; few very fine roots; few distinct dark gray (10YR 4/1) clay films in root channels; few fine dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

Cg—50 to 60 inches; mottled light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/6) silt loam; massive; friable; few very fine roots; few distinct dark gray (10YR 4/1) clay films in root channels; few fine dark concretions and stains (iron and manganese oxides); neutral.

The solum ranges from 40 to 50 inches in thickness. The mollic epipedon ranges from 15 to 22 inches in thickness.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1; or they are neutral and have value of 2 or 3. The Bg or Btg horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 or 2.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Sawmill soils are similar to Beaucoup and Comfrey soils and commonly are adjacent to Ambraw, Beaucoup, Comfrey, and Radford soils. Ambraw, Beaucoup, and Comfrey soils are in positions similar to those of the Sawmill soils. Ambraw and Comfrey soils are fine-loamy. Ambraw and Beaucoup soils have a thinner mollic epipedon than that of the Sawmill soils. Radford soils are slightly higher on flood plains than the Sawmill soils and are somewhat poorly drained.

Typical pedon of Sawmill silty clay loam, rarely flooded; 400 feet south and 2,485 feet east of the northwest corner of sec. 31, T. 17 N., R. 11 W.

Ap—0 to 11 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak fine granular; firm; few very fine roots; slightly acid; clear smooth boundary.

A1—11 to 21 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure; firm; few very fine roots; mildly alkaline; clear smooth boundary.

A2—21 to 34 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; common fine and medium distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; mildly alkaline; abrupt smooth boundary.

Bg—34 to 48 inches; mottled grayish brown (2.5Y 5/2), strong brown (7.5YR 5/8), and light brownish gray (2.5Y 6/2) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark stains (iron and manganese oxides); mildly alkaline; abrupt smooth boundary.

BCg—48 to 57 inches; gray (5Y 5/1) silty clay loam; common medium and coarse prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure; firm; common faint dark gray (5Y 4/1) coatings on faces of peds; few fine dark stains (iron and manganese oxides); mildly alkaline; clear smooth boundary.

Cg—57 to 60 inches; gray (5Y 5/1) silt loam; few fine prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine dark stains (iron and manganese oxides); mildly alkaline.

The solum ranges from 36 to 60 inches in thickness, and the mollic epipedon ranges from 24 to 36 inches in thickness.

The Ap and A horizons have chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. The Cg horizon is silty clay loam or silt loam.

Seaton Series

The Seaton series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 15 to 60 percent.

Seaton soils are similar to Fayette, Rozetta, and Sylvan soils and commonly are adjacent to Arenzville, Hamburg, Hickory, and Timula soils. Arenzville soils are on flood plains and are moderately well drained. Fayette, Rozetta, and Sylvan soils have more clay in the argillic horizon. The Hamburg soils are in positions similar to those of the Seaton soils and are coarse-silty and somewhat excessively drained. Hickory soils formed in glacial till and are on side slopes at a lower elevation than the Seaton soils. Timula soils are coarse-silty and are on side slopes at a higher elevation than the Seaton soils.

Typical pedon of Seaton silt loam, from an area of Seaton-Timula silt loams, 30 to 60 percent slopes; 450 feet north and 110 feet west of the center of sec. 27, T. 18 N., R. 11 W.

A—0 to 3 inches; mixed very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

E—3 to 6 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) and light brownish gray (10YR 6/2) dry; weak thin platy structure; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) coatings on faces of peds; medium acid; abrupt smooth boundary.

BE—6 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt1—12 to 24 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine and fine subangular blocky structure; friable; few very fine roots; common faint dark brown (7.5YR 4/4) clay films on faces of peds; medium acid; abrupt smooth boundary.

Bt2—24 to 32 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium angular blocky structure; firm; few very fine roots; many faint dark brown (7.5YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—32 to 44 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; common faint dark brown (7.5YR 4/4) clay films on faces of peds; medium acid; gradual smooth boundary.

Bt4—44 to 54 inches; dark yellowish brown (10YR 4/4)

silt loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint dark brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

BC—54 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure; firm; few very fine roots; slightly acid.

The solum ranges from 45 to more than 60 inches in thickness. The A horizon has chroma of 2 or 3. The E horizon has value of 4 or 5 and chroma of 2 to 4. The Bt horizon has value of 4 or 5 and chroma of 3 or 4.

Sparta Series

The Sparta series consists of excessively drained, rapidly permeable soils on stream terraces. These soils formed in sandy material. Slope ranges from 1 to 7 percent.

Sparta soils commonly are adjacent to Ambraw, Dickinson, Gilford, Plainfield, and Watseka soils. Ambraw soils are on flood plains and are poorly drained. Dickinson, Gilford, and Watseka soils are lower on terraces than the Sparta soils. Dickinson soils are well drained, Gilford soils are very poorly drained, and Watseka soils are somewhat poorly drained. Plainfield soils are in positions similar to those of the Sparta soils and do not have a mollic epipedon.

Typical pedon of Sparta loamy sand, 1 to 7 percent slopes; 2,625 feet south and 60 feet east of the northwest corner of sec. 2, T. 17 N., R. 12 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loamy sand, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to weak medium granular; very friable; few very fine roots; common faint very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

AB—10 to 17 inches; very dark grayish brown (10YR 3/2) loamy sand, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure; very friable; few very fine roots; slightly acid; clear smooth boundary.

Bw1—17 to 23 inches; brown (10YR 4/3) loamy sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; common faint dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw2—23 to 30 inches; dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; few very fine roots; common faint brown (10YR 4/3) coatings on faces of peds; medium acid; clear smooth boundary.

BC—30 to 39 inches; yellowish brown (10YR 5/4) sand; weak medium subangular blocky structure; very friable; few very fine roots; common faint dark yellowish brown (10YR 4/4) coatings on faces of peds; medium acid; clear smooth boundary.

C—39 to 60 inches; yellowish brown (10YR 5/6) sand; single grained; loose; medium acid.

The solum ranges from 25 to 40 inches in thickness. The mollic epipedon ranges from 10 to 21 inches in thickness.

The Ap or A horizon has chroma of 2 or 3. The Bw horizon has value of 4 or 5 and is loamy sand or sand. The C horizon is fine sand or sand.

Sylvan Series

The Sylvan series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 5 to 30 percent.

Sylvan soils are similar to Fayette, Rozetta, and Seaton soils and commonly are adjacent to Arenzville, Bold, Fayette, and Rozetta soils. Arenzville soils are moderately well drained and are on flood plains. Bold soils are calcareous throughout and are on side slopes at a lower elevation than the Sylvan soils. Fayette, Rozetta, and Seaton soils do not have carbonates within a depth of 40 inches and are higher than the Sylvan soils on side slopes and on ridges.

Typical pedon of Sylvan silt loam, 15 to 30 percent slopes; 210 feet south and 2,580 feet west of the northeast corner of sec. 28, T. 18 N., R. 10 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; common very fine roots; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

E1—4 to 8 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; few very fine and medium roots; many faint dark grayish brown (10YR 4/2) coatings on faces of peds; medium acid; clear smooth boundary.

E2—8 to 10 inches; dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; few

very fine roots; slightly acid; clear smooth boundary.
Bt1—10 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; firm; very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.
Bt2—17 to 23 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine angular and subangular blocky structure; firm; few very fine and medium roots; many distinct dark yellowish brown (10YR 4/4) and few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.
BC—23 to 27 inches; yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; friable; few very fine roots; common faint yellowish brown (10YR 5/6) and few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.
C1—27 to 41 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; massive; friable; few very fine roots; few fine and medium snail shells; strong effervescence; mildly alkaline; clear smooth boundary.
C2—41 to 60 inches; light brownish gray (10YR 6/2) silt loam; common medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; common fine and medium snail shells; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates range from 22 to 40 inches.

The Ap or A horizon has value of 3 to 5 and chroma of 2 to 4. It is commonly silt loam, but in severely eroded areas it is silty clay loam. The E horizon has value of 4 or 5 and chroma of 2 or 4. Some eroded pedons do not have an E horizon. The Bt horizon has chroma of 3 to 6.

Tallula Series

The Tallula series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 7 to 30 percent.

Tallula soils commonly are adjacent to Bold, Ipava, Radford, and Tama soils. Bold soils are calcareous throughout and are on side slopes at a lower elevation than the Tallula soils. Ipava and Tama soils are in positions higher than those of the Tallula soils. Ipava soils are somewhat poorly drained, and Tama soils are moderately well drained and well drained. Radford soils are on flood plains and are somewhat poorly drained.

Typical pedon of Tallula silt loam, 7 to 15 percent slopes; 1,330 feet south and 154 feet east of the northwest corner of sec. 4, T. 17 N., R. 10 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; strong fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.
A2—4 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine and medium granular structure; friable; common very fine roots; neutral; clear smooth boundary.
BA—10 to 16 inches; brown (10YR 4/3) silt loam; weak very fine and fine subangular blocky structure; friable; few very fine roots; many faint dark brown (10YR 3/3) organic coatings on faces of peds; neutral; clear smooth boundary.
Bw—16 to 26 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) coatings on faces of peds; neutral; clear smooth boundary.
C1—26 to 31 inches; pale brown (10YR 6/3) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; slight effervescence; mildly alkaline; clear smooth boundary.
C2—31 to 60 inches; light brownish gray (10YR 6/2) silt; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; few fine concretions (calcium carbonate); few fine dark stains (iron and manganese oxides); slight effervescence; mildly alkaline.

The solum thickness and the depth to carbonates range from 20 to 35 inches. The mollic epipedon ranges from 8 to 15 inches in thickness.

The Ap or A horizon has chroma of 1 to 3. The Bw horizon has value of 4 or 5 and chroma of 3 or 4.

Tama Series

The Tama series consists of moderately well drained and well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 10 percent.

Tama soils are similar to Elkhart soils and commonly are adjacent to Elkhart, Ipava, Sable, and Tallula soils. Elkhart and Tallula soils are on side slopes at a lower elevation than the Tama soils and have carbonates within a depth of 40 inches. Ipava and Sable soils are

generally in less sloping areas at a lower elevation than the Tama soils. Ipava soils are somewhat poorly drained, and Sable soils are poorly drained.

Typical pedon of Tama silt loam, 2 to 5 percent slopes; 1,200 feet north and 282 feet west of the southeast corner of sec. 4, T. 17 N., R. 9 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak fine and medium granular; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

A—11 to 17 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure parting to weak very fine and fine granular; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—17 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 3/3 and 4/3) clay films and many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt2—24 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films and few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt3—30 to 38 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

Bt4—38 to 49 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; gradual smooth boundary.

BC—49 to 60 inches; yellowish brown (10YR 5/4) silt loam; weak medium and coarse subangular blocky structure; friable; few very fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine very dark gray (10YR 3/1) wormcasts; few fine dark stains (iron and manganese oxides); medium acid.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon ranges from 10 to 22 inches in thickness.

The Ap or A horizon has chroma of 1 or 2. The Bt horizon has chroma of 3 or 4.

Thorp Series

The Thorp series consists of poorly drained, slowly permeable soils on stream terraces. These soils formed in loess and the underlying loamy material. Slope ranges from 0 to 2 percent.

Thorp soils commonly are adjacent to Beardstown, Littleton, Raddle, and Worthen soils. Beardstown, Littleton, Raddle, and Worthen soils are higher on terraces than the Thorp soils. Beardstown and Littleton soils are somewhat poorly drained, and Raddle and Worthen soils are well drained.

Typical pedon of Thorp silt loam; 465 feet north and 1,200 feet west of the southeast corner of sec. 25, T. 17 N., R. 13 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; neutral; abrupt smooth boundary.

E1—11 to 15 inches; mottled light brownish gray (2.5Y 6/2), grayish brown (2.5Y 5/2), and dark yellowish brown (10YR 4/6) silt loam, light gray (10YR 7/2) dry; weak medium subangular blocky structure parting to weak fine and medium platy; friable; few very fine roots; common prominent very dark gray (10YR 3/1) organic coatings and white (10YR 8/1) dry silt coatings on faces of peds; neutral; clear smooth boundary.

E2—15 to 19 inches; mottled light brownish gray (2.5Y 6/2), grayish brown (2.5Y 5/2), and brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; few faint dark grayish brown (2.5Y 4/2) coatings, few distinct very dark gray (10YR 3/1) organic coatings, and common prominent white (10YR 8/1) dry silt coatings on faces of peds; slightly acid; clear smooth boundary.

Btg1—19 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam; many medium and coarse prominent

brown (7.5YR 4/4) mottles and few medium and coarse prominent strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct dark gray (10YR 4/1) clay films, few distinct very dark gray (10YR 3/1) organic coatings, and common prominent white (10YR 8/1) dry silt coatings on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

Btg2—23 to 30 inches; mottled dark gray (10YR 4/1), gray (10YR 5/1), and strong brown (7.5YR 5/6) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films, few distinct very dark gray (10YR 3/1) organic coatings, and common prominent white (10YR 8/1) dry silt coatings on faces of peds; few fine and medium dark concretions and stains (iron and manganese oxides); medium acid; clear smooth boundary.

Btg3—30 to 38 inches; mottled dark gray (10YR 4/1), gray (10YR 5/1), and strong brown (7.5YR 5/6) silty clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films and very dark gray (10YR 3/1) organic coatings, and few prominent white (10YR 8/1) dry silt coatings on faces of peds; few fine and medium dark concretions and stains (iron and manganese oxides); medium acid; clear smooth boundary.

Btg4—38 to 50 inches; mottled grayish brown (2.5Y 5/2), light brownish gray (2.5Y 6/2), and strong brown (7.5YR 5/6) silty clay loam; weak medium and coarse subangular blocky structure; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings in root channels; few fine and medium dark concretions and stains (iron and manganese oxides); slightly acid; clear smooth boundary.

2BCg—50 to 60 inches; light brownish gray (2.5Y 6/2) loam; many medium and coarse prominent strong brown (7.5YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable; few very fine roots; few distinct very dark gray (10YR 3/1) organic coatings in root channels; few fine and medium dark concretions and stains (iron and manganese oxides); slightly acid.

The solum ranges from 45 to more than 60 inches in thickness. The loess ranges from 45 to 54 inches in thickness. The mollic epipedon ranges from 10 to 14 inches in thickness.

The Ap horizon has value of 2 or 3. The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. The 2BCg horizon has hue of 10YR or 2.5Y and value of 5 or 6.

Tice Series

The Tice series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Tice soils commonly are adjacent to Beaucoup, Medway, and Sawmill soils. Beaucoup and Sawmill soils are slightly lower on the flood plains than the Tice soils and are poorly drained. Medway soils are slightly higher on the flood plains and are moderately well drained.

Typical pedon of Tice silty clay loam, frequently flooded; 1,189 feet north and 878 feet west of the southeast corner of sec. 4, T. 18 N., R. 11 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium granular; firm; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A—9 to 14 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium granular; firm; few very fine roots; few fine and medium dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

AB—14 to 19 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; common fine and medium faint dark grayish brown (10YR 4/2) mottles; weak fine and medium subangular blocky structure; firm; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine and medium dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

Bw1—19 to 24 inches; mottled dark grayish brown (10YR 4/2) and brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine and medium dark concretions and

stains (iron and manganese oxides); neutral; clear smooth boundary.

Bw2—24 to 37 inches; mottled grayish brown (10YR 5/2), brown (10YR 5/3), and yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few very dark gray (10YR 3/1) krotovina; few fine and medium dark concretions and stains (iron and manganese oxides); neutral; clear smooth boundary.

Bw3—37 to 53 inches; grayish brown (10YR 5/2) silty clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common faint gray (10YR 5/1) and dark gray (10YR 4/1) coatings on faces of peds; few faint dark gray (10YR 4/1) coatings in root channels; neutral; clear smooth boundary.

BC—53 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few distinct dark gray (10YR 4/1) coatings in root channels; neutral.

The solum ranges from 30 to more than 60 inches in thickness. The mollic epipedon ranges from 15 to 20 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. They are dominantly silty clay loam but are silt loam in some pedons. The Bw horizon has chroma of 2 to 4.

Timula Series

The Timula series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 15 to 60 percent.

Timula soils commonly are adjacent to Fayette, Hamburg, Rozetta, and Seaton soils. Fayette, Rozetta, and Seaton soils are fine-silty. Fayette and Rozetta soils are on side slopes at a higher elevation than the Timula soils, and Seaton soils are on side slopes at a lower elevation. Hamburg soils are calcareous throughout and are in positions similar to those of the Timula soils.

Typical pedon of Timula silt loam, from an area of Seaton-Timula silt loams, 30 to 60 percent slopes; 455 feet north and 200 feet west of the center of sec. 27, T. 18 N., R. 11 W.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; some mixing of dark brown (10YR 4/3); moderate medium granular structure; friable; common very fine and few medium roots; neutral; abrupt smooth boundary.

E1—5 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak thin platy structure; friable; common very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt smooth boundary.

E2—7 to 9 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium platy structure; friable; common very fine roots; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Bw1—9 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common very fine roots; common faint dark brown (10YR 4/3) coatings on faces of peds; few medium very dark grayish brown (10YR 3/2) wormcasts; neutral; clear smooth boundary.

Bw2—14 to 21 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silt loam; weak medium and coarse subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) coatings on faces of peds; neutral; clear smooth boundary.

BC—21 to 27 inches; yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) silt loam; weak medium and coarse subangular blocky structure; friable; few very fine roots; mildly alkaline; clear smooth boundary.

C1—27 to 33 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; few very fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

C2—33 to 60 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; few very fine roots; strong effervescence; mildly alkaline.

The thickness of the solum and the depth to carbonates range from 20 to 32 inches. The A horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has value of 4 or 5 and chroma or 3 or 4. The Bw horizon has value of 4 or 5 and chroma of 3 or 4.

Watseka Series

The Watseka series consists of somewhat poorly drained, rapidly permeable soils on stream terraces.

These soils formed in sandy material. Slope ranges from 0 to 2 percent.

Watseka soils are similar to Hoopeston soils and commonly are adjacent to Gilford, Hoopeston, Orio, Plainfield, and Sparta soils. Gilford and Hoopeston soils are coarse-loamy. Gilford soils are lower on the terraces than the Watseka soils and are very poorly drained. Hoopeston soils are in positions similar to those of the Watseka soils. Orio soils are in shallow depressions at a lower elevation and are poorly drained. Plainfield and Sparta soils are higher on the terraces than the Watseka soils and are excessively drained.

Typical pedon of Watseka sand; 258 feet south and 204 feet east of the center of sec. 4, T. 17 N., R. 12 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) sand, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; few very fine roots; slightly acid; clear smooth boundary.

A—7 to 17 inches; very dark grayish brown (10YR 3/2) sand, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak very fine and fine granular; very friable; few very fine roots; few faint very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BA—17 to 22 inches; dark grayish brown (10YR 4/2) sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few medium dark brown (7.5YR 4/4) stains (iron and manganese oxides); strongly acid; clear smooth boundary.

Bw—22 to 28 inches; dark grayish brown (10YR 4/2) sand; common fine distinct strong brown (7.5YR 5/6) mottles and few fine faint grayish brown mottles; weak medium subangular blocky structure; very friable; few very fine roots; strongly acid; clear smooth boundary.

BC—28 to 36 inches; grayish brown (10YR 5/2) sand; common medium faint brown (10YR 5/3) mottles; weak medium and coarse subangular blocky structure; loose; few very fine roots; strongly acid; gradual smooth boundary.

C—36 to 60 inches; light brownish gray (10YR 6/2) sand; few medium distinct yellowish brown (10YR 5/6) mottles; single grained; loose; medium acid.

The solum ranges from 30 to 40 inches in thickness. The mollic epipedon ranges from 10 to 17 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. They are sand or loamy sand. The Bw horizon has value of 4 to 6 and chroma of 2 or 3. It is sand or loamy sand.

Worthen Series

The Worthen series consists of well drained, moderately permeable soils on alluvial fans and stream terraces. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Worthen soils are similar to Raddle soils and commonly are adjacent to Littleton, Raddle, and Sparta soils. Littleton soils are in positions slightly lower than those of the Worthen soils and are somewhat poorly drained. Raddle soils have a thinner mollic epipedon and are in more sloping areas at a higher elevation. Sparta soils are sandy and are higher on the terraces than the Worthen soils.

Typical pedon of Worthen silt loam; 2,070 feet south and 1,185 feet east of the northwest corner of sec. 28, T. 18 N., R. 11 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak fine and medium granular; friable; few very fine roots; neutral; abrupt smooth boundary.

A—7 to 24 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak medium granular; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

AB—24 to 31 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to weak fine and medium granular; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw1—31 to 34 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw2—34 to 51 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 4/3) coatings on faces of peds; neutral; gradual smooth boundary.

BC—51 to 58 inches; yellowish brown (10YR 5/4) silt

loam; weak medium subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.

C—58 to 60 inches; yellowish brown (10YR 5/6) silt loam; massive; friable; slight effervescence; mildly alkaline.

The solum ranges from 35 to 60 inches in thickness. The mollic epipedon ranges from 24 to 40 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 to 3. The Bw horizon has value of 3 or 4 and chroma of 2 to 4.

Formation of the Soils

Soil forming processes act on parent material deposited by geologic agents, such as wind, water, or glacial ice. The characteristics of a soil at any given point are determined by the physical and mineralogical composition of the parent material, the plant and the animal life on or in the soil, the climate under which the soil material has accumulated and existed since accumulation, the topography, and the length of time the processes of soil formation have acted on the soil material. These factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one unless conditions are specified for the other four *(5)*.

Parent Material

Parent material is the unconsolidated geologic material in which a soil forms. It determines the chemical and mineralogical composition of the soil. In Cass County, the parent material was deposited by wind, water, glaciers, or meltwater from the glaciers. In some areas, it was reworked and redeposited by subsequent actions of water and wind. The soils in this county formed dominantly in till, loamy outwash, sand, loess, alluvium, and colluvium.

Two glacial advances contributed material to Cass County soils. The Illinoian glacier covered the entire county. Long after the Illinoian glacier disappeared, the Wisconsin glacier approached but did not touch Cass County. This last glacier did, however, cover the headwaters of the Sangamon and Illinois Rivers. Its melting sent tremendous quantities of water through these rivers, depositing sediment on the flood plains.

Glacial till is material deposited directly by glacial ice. It is a mixture of particles of various sizes, and in Cass County, it is loam or clay loam. The Hickory soils are the only soils in the county that formed in glacial till.

Outwash material was deposited by running water from melting glaciers. The size of the particles varies depending on the speed of the stream that carried the material. Individual layers generally are made up of particles of similar size, such as loam, sandy loam, sand, and other coarse particles. When the water slowed down, the coarser particles were deposited. The finer particles, such as very fine sand, silt, and clay were carried by the more slowly moving water. The Dickinson, Gilford, and Orio soils formed in outwash deposits.

Through the melting of the Wisconsin glacier, the climate alternated between cold and temperate stages. During the colder spells when the ice was not melting, the mud flats of the river bottom dried. When these flats were exposed to the action of wind, the fine sediment was blown into the air and deposited on the upland. The wind sorted the particles and deposited the coarser particles, such as sand, nearest the source and the finer particles, such as silt, farther away.

Sand dunes formed from the windblown sand particles. They are most extensive in the western part of the county. Most of the dunes are on terraces along the Illinois and Sangamon Rivers; some are on uplands along the bluffs. The Plainfield and Sparta soils are in areas where sand dunes are common. Loess, or wind-deposited silty material, contains a considerable amount of calcium carbonates and iron and manganese concretions. In Cass County, the loess ranges in thickness from more than 100 feet near the bluffs to about 15 feet in the southeastern part of the county *(12)*. The Hamburg and Ipava soils formed entirely in loess.

After the sand and loess were blown onto the upland, the bluffs eroded, leaving silty material at their base. This material is called colluvium. The Raddle soils formed in this silty colluvium.

Soils on flood plains and in other bottom land areas formed in water-laid material that ranges from loam to silty clay. Many bottom land areas and flood plains still receive sediment deposited by water. The Ambraw soils formed in loamy alluvial sediment on flood plains along rivers and major streams. The Sawmill and Arenzville soils formed in silty alluvial sediment on flood plains along major and minor streams.

Plant and Animal Life

Living organisms are important to soil formation. Vegetation is generally responsible for the amount of organic matter and nutrients in the soil and for the color of the surface layer. Plant roots provide channels for the movement of water and air through the soil and also add organic matter as they decay. Earthworms, insects, and burrowing animals help keep the soil open and porous, and they incorporate organic matter into the soil. As micro-organisms, such as bacteria and fungi, decompose dead vegetation and animals in and on the soil, nutrients are released for use by other plants. The role of animals in supplying the soil with organic matter is generally secondary to that of plants.

The soils that formed under grasses have a thick, black to dark brown surface layer. The Ipava and Tama soils developed on the broad prairies under wildflowers and grasses, such as big bluestem, indiangrass, and prairie dropseed *(4)* (fig. 17). In the drier areas, such as those where Sparta soils formed, little bluestem and porcupinegrass were dominant. In the wetter areas, such as those where Hartsburg and Sable soils formed, switchgrass and prairie cordgrass were common.

Various species of oak, hickory, maple, elm, and ash were dominant in wooded areas. Hackberry and walnut trees also grew in these areas. The surface layer of the soils that formed under trees is lighter in color than that of the soils that formed under grasses. Organic matter in the surface layer of these soils consists mainly of decomposed leaves. Fayette, Hickory, and Rozetta soils formed under forest vegetation.

Bluejoint reedgrass and various reeds and sedges grew in the marshes. Ambraw, Beaucoup, and Comfrey soils developed in these areas. These bottom land soils are dark in color primarily because the water-laid material is dark and secondarily as a result of plant and animal influences.

Climate

Cass County has a temperate, humid, continental climate which has been mostly uniform during the formation of the soils. Because of this uniformity, none of the soils have characteristics caused solely by climatic differences.

Climate affects soil formation through its effects on weathering, plant and animal life, and erosion. The rate of weathering increases as temperature and precipitation increase. Water from rain and melting snow seeps slowly downward through the soil causing physical and chemical changes. In many of the soils the percolating water has moved clay from the surface layer into the subsoil. It has also dissolved minerals and moved them downward through the profile. As a result, most of the upland soils of the county have considerably more clay in the subsoil than in the surface layer. In addition, the free calcium carbonate has been removed from the upper layers of many of the soils, leaving these layers slightly acid or medium acid.

Climate also influences soil formation by stimulating the growth of living organisms, particularly plants. Well distributed rainfall and seasonal freezing temperatures promote the accumulation of organic matter in most of the soils that are under grasses. Soils that formed under forest vegetation were influenced more by the vegetation and topography than by the climate.

Topography

Variations in the slope of the land surface affect the natural drainage, erosion, runoff, and deposition of soil.

A comparison between soils that formed in similar parent material but under different drainage conditions indicates the effect of slope on soil formation. Sable and Elkhart soils formed in loess. Sable soils are nearly level and poorly drained and have a grayish subsoil. Elkhart soils are sloping and well drained and have a brownish subsoil. The differences in color of the subsoil are influenced by the degree of oxidation of certain mineral compounds, chiefly iron. Nearly level or depressional soils, such as Sable soils, have a water table close to the surface nearly all year. The water in the soil pores restricts the circulation of air, which results in poorly oxidized iron and a gray color. The water table is lower in the more sloping Elkhart soils, and some of the rainfall runs off the surface. These soils are drier, and more air is in the pores. This results in better oxidized iron in the subsoil and a brown color.

Topography also determines the intensity of erosion. The steeper soils generally are more severely eroded than the less sloping soils. On some soils, such as Bold soils, erosion is so rapid that the surface soil particles are removed as rapidly as the soil forms. These soils are weakly developed and shallow to the underlying parent material.

As the slope gradient increases, runoff increases and infiltration into the soil decreases. As a result, less clay is moved downward by water into the subsoil of the more sloping soils. The sloping to steep Sylvan soils, for example, have less clay in the subsoil than the nearly level Keomah soils. As runoff increases, erosion also increases, resulting in more deposition onto land at the base of the slopes.

Figure 17.—The Ipava and Tama soils formed under native prairie weeds and grasses.

Time

Time greatly affects the degree of profile development in a soil. The influence of time, however, can be modified by erosion, deposition of material, topography, and kind of parent material.

On some of the steeper soils, erosion removes the surface soil material as soon as the soil forms. These soils are immature even though the slopes have been exposed to weathering for thousands of years. Hamburg soils are an example.

The soils on flood plains receive alluvial material during each flood. This repeated deposition slows soil formation. Arenzville soils are an example of soils formed in alluvial material.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vol., illus.

(2) American Society for Testing and Materials. 1986. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Fehrenbacher, J.B., R.A. Pope, I.J. Jansen, J.D. Alexander, and B.W. Ray. 1978. Soil productivity in Illinois. Coop. Ext. Serv. Circ. 1156. Univ. Ill. 21 pp., illus.

(4) Hitchcock, A.S. 1968. Key to native perennial grasses—Midwest region east of the Great Plains. Abstracted from Hitchcock's Manual of Grasses. U.S. Dep. Agric., Soil Conserv. Serv. Tech. Pap. 151. 151 pp., illus.

(5) Jenny, Hans. 1941. Factors of soil formation. 281 pp., illus.

(6) Perrin, W.H. 1968. Cass County sesquicentennial history. Board of Superv., Cass Cty. 482 pp., illus.

(7) Smith, G.D., F.F. Riecken, and R.S. Smith. 1947. Cass County soils, soil report 71. Univ. Ill. 47 pp., illus.

(8) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.

(9) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(10) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(11) United States Department of Commerce, Bureau of the Census. 1984. 1982 census of agriculture Part 13, Ill. state and county data, 443 pp., illus.

(12) Willman, H.R., and John C. Frye. 1970. Pleistocene stratigraphy of Illinois. Ill. Geol. Surv. Bull. 94. 204 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catwalks. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay,

less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants

throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then

deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying 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.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

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, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, 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 of 10YR hue, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to adversely affect the physical condition of the subsoil.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils

of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of

consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Jacksonville, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	34.3	16.4	25.4	39	12	0	1.46	0.66	2.43	4	5.0
February----	39.4	20.7	30.1	45	16	0	1.61	.76	2.60	4	5.5
March-------	52.3	27.8	40.1	55	25	0	3.14	1.55	4.64	6	4.0
April-------	65.0	42.3	53.7	67	39	170	3.99	2.25	6.37	7	.2
May---------	74.9	52.0	63.5	79	48	418	4.47	2.46	7.10	7	.0
June--------	83.9	61.0	72.5	88	59	698	4.05	1.28	6.47	6	.0
July--------	87.3	64.6	76.0	90	62	806	3.95	1.47	5.62	6	.0
August------	85.0	62.5	73.8	88	60	738	3.66	1.01	6.04	5	.0
September---	78.4	54.5	67.0	82	51	510	3.66	1.14	6.17	6	.0
October-----	67.9	43.8	55.9	71	40	210	2.95	1.09	4.59	5	.0
November----	52.5	32.4	42.5	57	29	0	2.21	1.12	3.01	5	1.2
December----	39.6	22.7	31.2	43	19	0	1.96	.74	3.25	5	4.2
Yearly:											
Average---	63.3	41.9	52.6	---	---	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,550	37.11	15.53	58.19	66	20.1

* 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 1951-80 at Jacksonville, 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--	Mar. 14	Mar. 23	Mar. 25
2 years in 10 later than--	Mar. 18	Mar. 30	Apr. 5
5 years in 10 later than--	Mar. 31	Apr. 9	Apr. 22
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 19	Oct. 10	Oct. 5
2 years in 10 earlier than--	Oct. 28	Oct. 14	Oct. 8
5 years in 10 earlier than--	Nov. 3	Oct. 27	Oct. 16

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Jacksonville, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	194	187	157
8 years in 10	211	193	173
5 years in 10	220	202	181
2 years in 10	233	216	192
1 year in 10	247	222	198

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
8E	Hickory loam, 15 to 30 percent slopes	3,041	1.3
8G	Hickory loam, 30 to 60 percent slopes	2,793	1.1
17A	Keomah silt loam, 0 to 3 percent slopes	2,934	1.2
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded	1,952	0.8
19D2	Sylvan silt loam, 10 to 15 percent slopes, eroded	1,208	0.5
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded	786	0.3
19E	Sylvan silt loam, 15 to 30 percent slopes	559	0.2
30F	Hamburg silt loam, 20 to 35 percent slopes	2,765	1.1
30G	Hamburg silt loam, 35 to 60 percent slopes	4,105	1.7
34D	Tallula silt loam, 7 to 15 percent slopes	792	0.3
35D2	Bold silt loam, 7 to 15 percent slopes, eroded	1,231	0.5
35E2	Bold silt loam, 15 to 30 percent slopes, eroded	2,155	0.9
36A	Tama silt loam, 0 to 2 percent slopes	1,451	0.6
36B	Tama silt loam, 2 to 5 percent slopes	9,295	3.8
36C2	Tama silt loam, 5 to 10 percent slopes, eroded	2,559	1.1
37	Worthen silt loam	8,600	3.5
43A	Ipava silt loam, 0 to 2 percent slopes	18,656	7.6
43B	Ipava silt loam, 2 to 5 percent slopes	3,136	1.3
49	Watseka sand	1,644	0.7
53B	Bloomfield fine sand, 1 to 7 percent slopes	2,779	1.1
53D	Bloomfield fine sand, 7 to 15 percent slopes	1,544	0.6
54B	Plainfield sand, 1 to 7 percent slopes	13,103	5.4
54D	Plainfield sand, 7 to 15 percent slopes	2,266	0.9
54E	Plainfield sand, 15 to 30 percent slopes	1,046	0.4
68	Sable silty clay loam	4,545	1.9
70	Beaucoup silty clay loam, frequently flooded	1,860	0.8
71	Darwin silty clay	3,022	1.2
74	Radford silt loam, frequently flooded	3,140	1.3
78	Arenzville silt loam, frequently flooded	3,959	1.6
81	Littleton silt loam	4,860	2.0
87B	Dickinson fine sandy loam, 1 to 5 percent slopes	2,578	1.1
88B	Sparta loamy sand, 1 to 7 percent slopes	4,347	1.8
107	Sawmill silty clay loam, frequently flooded	3,899	1.6
131B	Alvin fine sandy loam, 2 to 5 percent slopes	649	0.3
131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded	291	0.1
131D	Alvin fine sandy loam, 10 to 15 percent slopes	307	0.1
172	Hoopeston sandy loam	1,347	0.6
188A	Beardstown loam, 0 to 3 percent slopes	883	0.4
200	Orio loam	1,839	0.8
201	Gilford sandy loam	1,914	0.8
206	Thorp silt loam	310	0.1
244	Hartsburg silty clay loam	9,056	3.6
279A	Rozetta silt loam, 0 to 2 percent slopes	3,218	1.3
279B	Rozetta silt loam, 2 to 5 percent slopes	6,558	2.7
280B	Fayette silt loam, 2 to 5 percent slopes	6,875	2.8
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	2,359	1.0
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded	1,231	0.5
280E	Fayette silt loam, 15 to 30 percent slopes	949	0.4
284	Tice silty clay loam, frequently flooded	1,537	0.6
302	Ambraw clay loam, frequently flooded	1,903	0.8
304A	Landes fine sandy loam, frequently flooded, 0 to 3 percent slopes	908	0.4
430B	Raddle silt loam, 2 to 5 percent slopes	1,899	0.8
430C	Raddle silt loam, 5 to 10 percent slopes	376	0.2
451	Lawson silt loam, frequently flooded	1,084	0.4
567C2	Elkhart silt loam, 5 to 10 percent slopes, eroded	3,702	1.5
682	Medway loam, frequently flooded	1,629	0.7
776	Comfrey clay loam, frequently flooded	1,630	0.7
943E	Seaton-Timula silt loams, 15 to 30 percent slopes	5,844	2.4
943G	Seaton-Timula silt loams, 30 to 60 percent slopes	3,679	1.5
962C3	Sylvan-Bold complex, 5 to 10 percent slopes, severely eroded	2,344	1.0
962D3	Sylvan-Bold complex, 10 to 15 percent slopes, severely eroded	7,695	3.2
962E2	Sylvan-Bold silt loams, 15 to 30 percent slopes, eroded	2,582	1.1
962E3	Bold-Sylvan complex, 15 to 30 percent slopes, severely eroded	2,107	0.9
965D2	Tallula-Bold silt loams, 7 to 15 percent slopes, eroded	4,030	1.7

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
965E	Tallula-Bold silt loams, 15 to 30 percent slopes	509	0.2
3070	Beaucoup silty clay loam, frequently flooded, undrained	11,696	4.7
3073A	Ross loam, frequently flooded, 0 to 3 percent slopes	647	0.3
3115	Dockery silt loam, frequently flooded	4,778	2.0
4776	Comfrey loam, ponded	715	0.3
7070	Beaucoup silty clay loam, rarely flooded	1,864	0.8
7078	Arenzville silt loam, rarely flooded	2,928	1.2
7107	Sawmill silty clay loam, rarely flooded	1,724	0.7
7284	Tice silty clay loam, rarely flooded	497	0.2
7302	Ambraw clay loam, rarely flooded	6,643	2.7
7682	Medway loam, rarely flooded	902	0.4
	Water	6,952	2.9
	Total	243,200	100.0

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
8E---------- Hickory	VIe	---	---	---	---	2.4	4.0
8G---------- Hickory	VIIe	---	---	---	---	---	2.4
17A---------- Keomah	IIw	129	39	52	72	5.2	8.5
19C3---------- Sylvan	IVe	97	30	46	57	4.3	7.2
19D2---------- Sylvan	IIIe	101	32	48	59	4.4	7.5
19D3---------- Sylvan	IVe	93	29	44	55	4.1	6.9
19E---------- Sylvan	VIe	---	---	---	---	3.7	6.6
30F, 30G-------- Hamburg	VIIe	---	---	---	---	---	2.7
34D---------- Tallula	IIIe	113	37	48	67	4.5	7.4
35D2---------- Bold	IIIe	67	20	31	41	3.0	5.0
35E2---------- Bold	VIe	---	---	---	---	2.5	4.2
36A---------- Tama	I	155	46	62	89	5.9	9.8
36B---------- Tama	IIe	153	46	61	88	5.8	9.7
36C2---------- Tama	IIIe	146	43	58	84	5.5	9.2
37---------- Worthen	I	151	46	62	88	5.9	9.8
43A---------- Ipava	I	163	52	66	91	6.1	10.2
43B---------- Ipava	IIe	161	51	65	90	6.0	10.1
49---------- Watseka	IIIs	92	31	43	62	3.7	6.2
53B---------- Bloomfield	IIIs	79	31	41	51	3.2	5.3

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
53D---------- Bloomfield	IVe	73	29	38	47	2.9	4.8
54B, 54D-------- Plainfield	VIs	---	---	---	---	2.3	3.6
54E---------- Plainfield	VIIs	---	---	---	---	---	---
68---------- Sable	IIw	156	51	61	85	---	---
70---------- Beaucoup	IVw	90	30	---	---	---	---
71---------- Darwin	IIIw	90	32	38	---	---	---
74---------- Radford	IIIw	100	32	---	---	3.9	6.5
78---------- Arenzville	IIw	105	35	---	---	4.0	6.6
81---------- Littleton	I	159	50	63	90	6.1	10.2
87B---------- Dickinson	IIe	98	37	45	76	3.9	6.4
88B---------- Sparta	IVs	84	29	37	52	3.3	5.4
107---------- Sawmill	IVw	96	35	---	---	---	---
131B---------- Alvin	IIe	97	37	48	66	4.1	6.8
131C2---------- Alvin	IIIe	93	35	44	63	3.8	6.4
131D---------- Alvin	IIIe	92	34	44	62	3.8	6.4
172---------- Hoopeston	IIs	105	33	47	70	4.1	6.8
188A---------- Beardstown	IIw	116	37	52	66	4.5	7.5
200---------- Orio	IIw	112	37	47	64	---	---
201---------- Gilford	IIw	110	39	46	68	---	---
206---------- Thorp	IIw	126	42	51	69	---	---

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
244---------- Hartsburg	IIw	145	47	56	79	---	---
279A---------- Rozetta	I	131	40	54	73	5.2	8.7
279B---------- Rozetta	IIe	130	40	53	72	5.1	8.6
280B---------- Fayette	IIe	128	39	52	72	5.1	8.6
280C2---------- Fayette	IIIe	121	37	50	69	4.9	8.1
280D2---------- Fayette	IIIe	119	36	49	67	4.8	8.0
280E---------- Fayette	VIe	---	---	---	---	4.5	6.8
284---------- Tice	IVw	97	30	---	---	---	4.7
302---------- Ambraw	IVw	87	28	---	---	---	---
304A---------- Landes	IIIw	67	23	---	---	2.5	4.1
430B---------- Raddle	IIe	148	45	58	82	5.7	9.6
430C---------- Raddle	IIIe	145	44	57	81	5.6	9.4
451---------- Lawson	IIIw	120	39	---	---	---	---
567C2---------- Elkhart	IIIe	123	37	49	68	4.7	7.9
682---------- Medway	IIIw	87	27	---	---	---	---
776---------- Comfrey	IIIw	90	33	---	---	---	---
943E---------- Seaton-Timula	VIe	---	---	---	---	3.4	5.7
943G---------- Seaton-Timula	VIIe	---	---	---	---	---	3.6
962C3---------- Sylvan-Bold	IVe	83	25	40	49	3.7	6.2
962D3---------- Sylvan-Bold	IVe	78	19	36	46	3.5	5.9

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
962E2--- Sylvan-Bold	VIe	---	---	---	---	3.1	5.2
962E3--- Bold-Sylvan	VIIe	---	---	---	---	2.7	4.5
965D2--- Tallula-Bold	IIIe	86	29	40	54	3.7	6.2
965E--- Tallula-Bold	VIe	---	---	---	---	3.2	5.4
3070--- Beaucoup	Vw	---	---	---	---	---	---
3073A--- Ross	IIw	70	30	---	---	4.5	7.5
3115--- Dockery	IVw	---	---	---	---	---	---
4776--- Comfrey	VIIIw	---	---	---	---	---	---
7070--- Beaucoup	IIw	138	46	55	75	---	---
7078--- Arenzville	I	138	42	56	79	5.4	9.0
7107--- Sawmill	IIw	147	47	54	76	---	---
7284--- Tice	I	153	47	61	84	5.7	9.5
7302--- Ambraw	IIw	132	43	52	70	---	---
7682--- Medway	I	132	42	53	72	5.3	8.8

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
8E---------- Hickory	5R	Moderate	Moderate	Slight	Slight	White oak---------- Northern red oak---- Black oak---------- Green ash---------- Bitternut hickory--- Yellow poplar--------	85 85 --- --- --- 95	67 67 --- --- --- 98	Eastern white pine, red pine, yellow poplar, sugar maple, white oak, black walnut.
8G---------- Hickory	5R	Severe	Severe	Slight	Slight	White oak---------- Northern red oak---- Black oak---------- Green ash---------- Bitternut hickory--- Yellow poplar--------	85 85 --- --- --- 95	67 67 --- --- --- 98	Eastern white pine, red pine, yellow poplar, sugar maple, white oak, black walnut.
19D2, 19D3------ Sylvan	6A	Slight	Slight	Slight	Slight	Yellow poplar------- White oak---------- Northern red oak---- Black walnut--------	90 80 80 ---	90 62 62 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
19E---------- Sylvan	6R	Moderate	Moderate	Moderate	Slight	Yellow poplar------- White oak---------- Northern red oak---- Black walnut--------	90 80 80 ---	90 62 62 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
30F---------- Hamburg	2R	Moderate	Moderate	Moderate	Slight	White oak---------- Bur oak---------- Eastern redcedar---- Post oak---------- Black oak----------	45 --- --- --- ---	30 --- --- --- ---	Bur oak, eastern redcedar, white oak.
30G---------- Hamburg	2R	Severe	Severe	Severe	Slight	White oak---------- Bur oak---------- Eastern redcedar---- Post oak---------- Black oak----------	45 --- --- --- ---	30 --- --- --- ---	Bur oak, eastern redcedar, white oak.
53B, 53D-------- Bloomfield	4S	Slight	Slight	Moderate	Slight	Black oak---------- White oak---------- Scarlet oak--------- Shagbark hickory----	70 --- --- ---	52 --- --- ---	Eastern white pine, Scotch pine, red pine, eastern redcedar, jack pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
54B, 54D-------- Plainfield	4S	Slight	Slight	Moderate	Slight	Black oak---------- White oak---------- Black cherry-------- Scarlet oak--------- Northern red oak----	70 55 --- 68 ---	52 38 --- 50 ---	Red pine, eastern white pine, jack pine.
54E---------- Plainfield	4R	Moderate	Severe	Moderate	Slight	Black oak---------- White oak---------- Black cherry-------- Scarlet oak--------- Northern red oak----	70 55 --- 68 ---	52 38 --- 50 ---	Red pine, eastern white pine, jack pine.
78---------- Arenzville	3A	Slight	Slight	Slight	Slight	Northern red oak---- Bur oak---------- Silver maple--------	65 --- ---	48 --- ---	Red pine, eastern white pine, white spruce, northern red oak, black walnut.
131B, 131C2, 131D---------- Alvin	4A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Black walnut-------- Yellow poplar-------	80 80 --- 90	62 62 --- 90	Green ash, black walnut, yellow poplar, white oak, eastern white pine, American sycamore, sugar maple.
279A, 279B------ Rozetta	4A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Yellow poplar------- Black walnut--------	80 80 90 ---	62 62 90 ---	Eastern white pine, northern red oak, green ash, Scotch pine, yellow poplar.
280B, 280C2, 280D2---------- Fayette	4A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Yellow poplar------- Black walnut--------	80 80 90 ---	62 62 90 ---	Eastern white pine, northern red oak, green ash, yellow poplar.
280E---------- Fayette	4R	Moderate	Moderate	Slight	Slight	White oak---------- Northern red oak---- Yellow poplar------- Black walnut--------	80 80 90 ---	62 62 90 ---	Eastern white pine, northern red oak, green ash, yellow poplar.
943E: Seaton----------	6R	Moderate	Moderate	Moderate	Slight	Yellow poplar------- White oak---------- Northern red oak---- Black walnut--------	90 90 80 ---	90 72 62 ---	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
943E:									
Timula	4R	Moderate	Moderate	Moderate	Slight	White oak	70	52	Eastern white pine, red pine, Scotch pine, white oak.
						Northern red oak	---	---	
						Green ash	---	---	
						Bur oak	---	---	
943G:									
Seaton	6R	Severe	Severe	Severe	Slight	Yellow poplar	90	90	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
						White oak	90	72	
						Northern red oak	80	62	
						Black walnut	---	---	
Timula	4R	Severe	Severe	Severe	Slight	White oak	70	52	Eastern white pine, red pine, Scotch pine, white oak.
						Northern red oak	---	---	
						Green ash	---	---	
						Bur oak	---	---	
962D3:									
Sylvan	6A	Slight	Slight	Slight	Slight	Yellow poplar	90	90	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
						White oak	80	62	
						Northern red oak	80	62	
						Black walnut	---	---	
Bold.									
962E2:									
Sylvan	6R	Moderate	Moderate	Moderate	Slight	Yellow poplar	90	90	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
						White oak	80	62	
						Northern red oak	80	62	
						Black walnut	---	---	
Bold.									
962E3:									
Bold.									
Sylvan	6R	Moderate	Moderate	Moderate	Slight	Yellow poplar	90	90	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
						White oak	80	62	
						Northern red oak	80	62	
						Black walnut	---	---	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
3070---------- Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak----------	90	72	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
						Eastern cottonwood--	100	128	
						Sweetgum----------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3073A---------- Ross	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	68	Eastern white pine, black walnut, white ash, Norway spruce, yellow poplar.
						Yellow poplar-------	96	100	
						Sugar maple---------	85	52	
						White oak----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash----------	---	---	
3115---------- Dockery	4A	Slight	Slight	Slight	Slight	Pin oak----------	76	58	Pin oak, pecan, eastern cottonwood.
7078---------- Arenzville	3A	Slight	Slight	Slight	Slight	Northern red oak----	65	48	Red pine, eastern white pine, white spruce, northern red oak, black walnut.
						Bur oak----------	---	---	
						Silver maple--------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
8E, 8G---------- Hickory	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
17A---------- Keomah	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
19C3, 19D2, 19D3, 19E---------- Sylvan	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
30F, 30G---------- Hamburg	Siberian peashrub	Osageorange, Russian olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, bur oak, black locust, green ash.	Siberian elm------	---
34D---------- Tallula	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
35D2, 35E2-------- Bold	Siberian peashrub	Osageorange, jack pine, eastern redcedar, Washington hawthorn, Russian olive.	Northern catalpa, honeylocust.	---	---
36A---------- Tama	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36B, 36C2--------- Tama	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
37---------- Worthen	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
43A, 43B---------- Ipava	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
49---------- Watseka	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
53B, 53D---------- Bloomfield	Siberian peashrub	Radiant crabapple, eastern redcedar, autumn olive, Washington hawthorn, Amur honeysuckle, lilac.	Austrian pine, jack pine, red pine.	Eastern white pine	---
54B, 54D, 54E----- Plainfield	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn olive, Amur honeysuckle, lilac.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
68---------- Sable	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
70---------- Beaucoup	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
71---------- Darwin	---	Amur privet, silky dogwood, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, Washington hawthorn, white fir.	Eastern white pine	Pin oak.
74---------- Radford	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
78---------- Arenzville	---	Amur privet, Amur honeysuckle, silky dogwood, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
81---------- Littleton	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Eastern white pine, Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Pin oak.
87B---------- Dickinson	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
88B---------- Sparta	Siberian peashrub	Amur honeysuckle, lilac, eastern redcedar, radiant crabapple, Washington hawthorn, autumn olive.	Red pine, jack pine, Austrian pine.	Eastern white pine	---
107---------- Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
131B, 131C2, 131D- Alvin	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Osageorange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---
172---------- Hoopeston	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
188A---------- Beardstown	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Blue spruce, white fir, northern whitecedar, Washington hawthorn, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
200---------- Orio	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern whitecedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
201---------- Gilford	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, northern whitecedar, Washington hawthorn, blue spruce, white fir, Austrian pine.	Eastern white pine	Pin oak.
206---------- Thorp	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
244---------- Hartsburg	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
279A, 279B-------- Rozetta	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
280B, 280C2, 280D2, 280E------ Fayette	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
284---------- Tice	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
302---------- Ambraw	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
304A---------- Landes	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
430B, 430C-------- Raddle	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
451---------- Lawson	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
567C2---------- Elkhart	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
682---------- Medway	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine.
776---------- Comfrey	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
943E, 943G: Seaton----------	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Timula----------	---	Osageorange, Russian olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, green ash.	---	---
962C3, 962D3, 962E2: Sylvan----------	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
962C3, 962D3, 962E2: Bold	Siberian peashrub	Osageorange, jack pine, eastern redcedar, Washington hawthorn, Russian olive.	Northern catalpa, honeylocust.	---	---
962E3: Bold	Siberian peashrub	Osageorange, jack pine, eastern redcedar, Washington hawthorn, Russian olive.	Northern catalpa, honeylocust.	---	---
Sylvan	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
965D2, 965E: Tallula	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Bold	Siberian peashrub	Osageorange, jack pine, eastern redcedar, Washington hawthorn, Russian olive.	Northern catalpa, honeylocust.	---	---
3070 Beaucoup	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3073A Ross	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
3115 Dockery	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Eastern white pine, pin oak.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
4776. Comfrey					
7070---------- Beaucoup	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
7078---------- Arenzville	---	Amur privet, Amur honeysuckle, silky dogwood, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
7107---------- Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
7284---------- Tice	Redosier dogwood, gray dogwood.	Silky dogwood, autumn olive.	Amur maple, Russian olive, baldcypress.	Eastern white pine, Norway spruce.	Eastern cottonwood, American sycamore, red maple.
7302---------- Ambraw	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
7682---------- Medway	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8E---------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8G---------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
17A---------- Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight----------	Slight.
19C3---------- Sylvan	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
19D2, 19D3---------- Sylvan	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
19E---------- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
30F, 30G---------- Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
34D---------- Tallula	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
35D2---------- Bold	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
35E2---------- Bold	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
36A---------- Tama	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
36B---------- Tama	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
36C2---------- Tama	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
37---------- Worthen	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
43A, 43B---------- Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
49---------- Watseka	Severe: too sandy, wetness.	Severe: too sandy.	Severe: wetness, too sandy.	Severe: too sandy.	Moderate: too sandy, wetness, droughty.
53B---------- Bloomfield	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
53D--- Bloomfield	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty, slope.
54B--- Plainfield	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
54D--- Plainfield	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
54E--- Plainfield	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
68--- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
70--- Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
71--- Darwin	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
74--- Radford	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
78--- Arenzville	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
81--- Littleton	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
87B--- Dickinson	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
88B--- Sparta	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
107--- Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
131B--- Alvin	Slight---	Slight---	Moderate: slope.	Slight---	Moderate: droughty.
131C2--- Alvin	Slight---	Slight---	Severe: slope.	Slight---	Moderate: droughty.
131D--- Alvin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope, droughty.
172--- Hoopeston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
188A---------- Beardstown	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
200---------- Orio	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
201---------- Gilford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
206---------- Thorp	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
244---------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
279A---------- Rozetta	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
279B---------- Rozetta	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
280B---------- Fayette	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
280C2---------- Fayette	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
280D2---------- Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
280E---------- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
284---------- Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
302---------- Ambraw	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
304A---------- Landes	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
430B---------- Raddle	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
430C---------- Raddle	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
451---------- Lawson	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
567C2---------- Elkhart	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
682---------- Medway	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
776--- Comfrey	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
943E:					
Seaton---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Timula---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
943G:					
Seaton---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Timula---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
962C3:					
Sylvan---	Slight---	Slight---	Severe: slope.	Slight---	Slight.
Bold---	Slight---	Slight---	Severe: slope.	Slight---	Slight.
962D3:					
Sylvan---	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Bold---	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
962E2:					
Sylvan---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Bold---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
962E3:					
Bold---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Sylvan---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
965D2:					
Tallula---	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.
Bold---	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
965E:					
Tallula---	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Bold---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
3070--Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3073A--Ross	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3115--Dockery	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
4776--Comfrey	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
7070--Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
7078--Arenzville	Severe: flooding.	Slight	Slight	Slight	Slight.
7107--Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
7284--Tice	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
7302--Ambraw	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
7682--Medway	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
8E---------- Hickory	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
8G---------- Hickory	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
17A---------- Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
19C3, 19D2, 19D3--- Sylvan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
19E---------- Sylvan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
30F, 30G---------- Hamburg	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
34D---------- Tallula	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
35D2---------- Bold	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
35E2---------- Bold	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
36A---------- Tama	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
36B---------- Tama	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
36C2---------- Tama	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
37---------- Worthen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
43A---------- Ipava	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
43B---------- Ipava	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
49---------- Watseka	Fair	Fair	Good	Good	Good	Fair	Poor	Fair	Good	Poor.
53B, 53D---------- Bloomfield	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
54B---------- Plainfield	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
54D, 54E---------- Plainfield	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
68---------- Sable	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
70---------- Beaucoup	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
71---------- Darwin	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Fair.
74---------- Radford	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
78---------- Arenzville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
81---------- Littleton	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
87B---------- Dickinson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
88B---------- Sparta	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
107---------- Sawmill	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
131B---------- Alvin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
131C2, 131D-------- Alvin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
172---------- Hoopeston	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
188A---------- Beardstown	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
200---------- Orio	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
201---------- Gilford	Fair	Poor	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
206---------- Thorp	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good.
244---------- Hartsburg	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
279A, 279B--------- Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
280B---------- Fayette	Good	Good	Good	Good	Good	Poor.	Very poor.	Good	Good	Very poor.
280C2, 280D2------- Fayette	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
280E---------- Fayette	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
284--Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
302--Ambraw	Good	Fair	Good	Good	Fair	Good	Good	Good	Good	Good.
304A--Landes	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
430B, 430C--Raddle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
451--Lawson	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
567C2--Elkhart	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
682--Medway	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
776--Comfrey	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
943E:										
Seaton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Timula	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
943G:										
Seaton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Timula	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Very poor.	Good	Very poor.
962C3, 962D3:										
Sylvan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Bold	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
962E2:										
Sylvan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Bold	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
962E3:										
Bold	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sylvan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
965D2:										
Tallula	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Bold	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
965E:										
Tallula.										
Bold	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
3070 Beaucoup	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3073A Ross	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3115 Dockery	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
4776 Comfrey	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
7070 Beaucoup	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
7078 Arenzville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
7107 Sawmill	Good	Good	Good	Fair	Fair	Good	Fair	Good	Fair	Fair.
7284 Tice	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
7302 Ambraw	Good	Fair	Good	Good	Fair	Good	Good	Good	Good	Good.
7682 Medway	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8E, 8G---------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
17A---------- Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, frost action, low strength.	Slight.
19C3---------- Sylvan	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
19D2, 19D3-------- Sylvan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
19E---------- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
30F, 30G---------- Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
34D---------- Tallula	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
35D2---------- Bold	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
35E2---------- Bold	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
36A---------- Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
36B---------- Tama	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
36C2---------- Tama	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
37---------- Worthen	Slight---------	Slight---------	Slight---------	Slight---------	Severe: low strength, frost action.	Slight.
43A, 43B---------- Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
49---------- Watseka	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: too sandy, wetness, droughty.
53B---------- Bloomfield	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
53D---------- Bloomfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
54B---------- Plainfield	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
54D---------- Plainfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
54E---------- Plainfield	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
68---------- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
70---------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
71---------- Darwin	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
74---------- Radford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
78---------- Arenzville	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
81---------- Littleton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.	Moderate: wetness.
87B---------- Dickinson	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
88B---------- Sparta	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
107---------- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
131B---------- Alvin	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: droughty.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
131C2---------- Alvin	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
131D---------- Alvin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, droughty.
172---------- Hoopeston	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
188A---------- Beardstown	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
200---------- Orio	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
201---------- Gilford	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
206---------- Thorp	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
244---------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
279A, 279B-------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
280B---------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
280C2---------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
280D2---------- Fayette	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
280E---------- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
284---------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
302---------- Ambraw	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
304A---------- Landes	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
430B---------- Raddle	Slight---------	Slight---------	Slight---------	Slight---------	Severe: frost action.	Slight.
430C---------- Raddle	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
451---------- Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
567C2---------- Elkhart	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
682---------- Medway	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Severe: flooding.
776---------- Comfrey	Severe: wetness, excess humus.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
943E, 943G: Seaton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Timula----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
962C3: Sylvan----------	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
Bold----------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
962D3: Sylvan----------	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
Bold----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
962E2: Sylvan----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
962E2:						
Bold	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
962E3:						
Bold	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
965D2:						
Tallula	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
Bold	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
965E:						
Tallula	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Bold	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
3070 Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3073A Ross	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
3115 Dockery	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
4776 Comfrey	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
7070 Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: ponding.
7078 Arenzville	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
7107---------- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
7284---------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, frost action.	Moderate: wetness.
7302---------- Ambraw	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
7682---------- Medway	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action, low strength.	Moderate: wetness.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8E, 8G---------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
17A---------- Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
19C3---------- Sylvan	Slight----------	Severe: slope.	Slight----------	Slight----------	Good.
19D2, 19D3---------- Sylvan	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
19E---------- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
30F, 30G---------- Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
34D---------- Tallula	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
35D2---------- Bold	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
35E2---------- Bold	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
36A---------- Tama	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
36B---------- Tama	Slight----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.
36C2---------- Tama	Slight----------	Severe: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
37---------- Worthen	Slight----------	Moderate: seepage.	Slight----------	Slight----------	Good.
43A, 43B---------- Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
49---------- Watseka	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
53B---------- Bloomfield	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
53D---------- Bloomfield	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
54B---------- Plainfield	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
54D---------- Plainfield	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
54E---------- Plainfield	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: too sandy, slope, seepage.
68---------- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
70---------- Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
71---------- Darwin	Severe: ponding, percs slowly.	Slight----------	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
74---------- Radford	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
78---------- Arenzville	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
81---------- Littleton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
87B---------- Dickinson	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
88B---------- Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
107---------- Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
131B---------- Alvin	Slight----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
131C2---------- Alvin	Slight----------	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
131D---------- Alvin	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
172---------- Hoopeston	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
188A---------- Beardstown	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
200---------- Orio	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: ponding.	Poor: seepage, too sandy, ponding.
201---------- Gilford	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
206---------- Thorp	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
244---------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
279A---------- Rozetta	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
279B---------- Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
280B---------- Fayette	Slight----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.
280C2---------- Fayette	Slight----------	Severe: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
280D2---------- Fayette	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
280E---------- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
284---------- Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
302---------- Ambraw	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
304A---------- Landes	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
430B---------- Raddle	Slight----------	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
430C---------- Raddle	Slight----------	Severe: slope.	Slight----------	Slight----------	Good.
451---------- Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
567C2---------- Elkhart	Slight----------	Severe: slope.	Slight----------	Slight----------	Good.
682---------- Medway	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness, seepage.	Fair: wetness.
776---------- Comfrey	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
943E, 943G:					
Seaton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Timula----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
962C3:					
Sylvan----------	Slight----------	Severe: slope.	Slight----------	Slight----------	Good.
Bold----------	Slight----------	Severe: slope.	Slight----------	Slight----------	Good.
962D3:					
Sylvan----------	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Bold----------	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
962E2:					
Sylvan----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Bold----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
962E3:					
Bold----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
962E3:					
Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
965D2:					
Tallula	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Bold	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
965E:					
Tallula	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Bold	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
3070--- Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3073A--- Ross	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
3115--- Dockery	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
4776--- Comfrey	Severe: flooding, ponding.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: too sandy, ponding.
7070--- Beaucoup	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
7078--- Arenzville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
7107--- Sawmill	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
7284--- Tice	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
7302--- Ambraw	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
7682--- Medway	Severe: wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Severe: wetness, seepage.	Fair: wetness.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
8E---------- Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
8G---------- Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
17A---------- Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
19C3---------- Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
19D2---------- Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
19D3---------- Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
19E---------- Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
30F, 30G---------- Hamburg	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
34D---------- Tallula	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
35D2---------- Bold	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
35E2---------- Bold	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36A, 36B, 36C2-------- Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
37---------- Worthen	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
43A, 43B---------- Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
49---------- Watseka	Fair: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy.
53B, 53D---------- Bloomfield	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
54B, 54D---------- Plainfield	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
54E---------- Plainfield	Fair: slope.	Probable----------	Improbable: too sandy.	Poor: too sandy, slope.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
68--- Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
70--- Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
71--- Darwin	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
74--- Radford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
78--- Arenzville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
81--- Littleton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
87B--- Dickinson	Good	Probable	Improbable: too sandy.	Good.
88B--- Sparta	Good	Probable	Improbable: too sandy.	Poor: too sandy.
107--- Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
131B, 131C2, 131D--- Alvin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
172--- Hoopeston	Fair: wetness.	Probable	Improbable: too sandy.	Fair: small stones, thin layer.
188A--- Beardstown	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
200--- Orio	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
201--- Gilford	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
206--- Thorp	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
244--- Hartsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
279A, 279B--- Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280B, 280C2--- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
280D2--- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
280E---------- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
284---------- Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
302---------- Ambraw	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
304A---------- Landes	Good----------	Probable----------	Improbable: too sandy.	Fair: too sandy, small stones, thin layer.
430B, 430C---------- Raddle	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
451---------- Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
567C2---------- Elkhart	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
682---------- Medway	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
776---------- Comfrey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
943E:				
Seaton----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Timula----------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
943G:				
Seaton----------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Timula----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
962C3:				
Sylvan----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Bold----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
962D3:				
Sylvan----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Bold----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
962E2:				
Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Bold	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
962E3:				
Bold	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
965D2:				
Tallula	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Bold	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
965E:				
Tallula	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Bold	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
3070 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3073A Ross	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3115 Dockery	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
4776 Comfrey	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
7070 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
7078 Arenzville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
7107 Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
7284 Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
7302 Ambraw	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
7682 Medway	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
8E, 8G---------- Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
17A---------- Keomah	Slight---------	Severe: hard to pack.	Frost action, percs slowly.	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.	Erodes easily, percs slowly.
19C3---------- Sylvan	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
19D2, 19D3, 19E--- Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
30F, 30G---------- Hamburg	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
34D---------- Tallula	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
35D2, 35E2-------- Bold	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
36A---------- Tama	Moderate: seepage.	Slight---------	Deep to water	Favorable------	Erodes easily	Erodes easily.
36B, 36C2--------- Tama	Moderate: slope, seepage.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
37---------- Worthen	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable------	Erodes easily	Erodes easily.
43A---------- Ipava	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
43B---------- Ipava	Moderate: slope.	Severe: wetness.	Frost action, slope.	Wetness, slope.	Erodes easily, wetness.	Wetness, erodes easily.
49---------- Watseka	Severe: seepage.	Severe: piping, seepage, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
53B---------- Bloomfield	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty, rooting depth.
53D---------- Bloomfield	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
54B---------- Plainfield	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
54D, 54E---------- Plainfield	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Droughty, slope.
68---------- Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
70---------- Beaucoup	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding--------	Wetness.
71---------- Darwin	Slight---------	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
74---------- Radford	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
78---------- Arenzville	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
81---------- Littleton	Moderate: seepage.	Severe: wetness, piping.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
87B---------- Dickinson	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing, slope.	Soil blowing, too sandy.	Favorable.
88B---------- Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
107---------- Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
131B, 131C2------- Alvin	Severe: seepage.	Severe: piping, seepage.	Deep to water	Slope, soil blowing, droughty.	Soil blowing---	Droughty.
131D---------- Alvin	Severe: seepage, slope.	Severe: piping, seepage.	Deep to water	Slope, soil blowing, droughty.	Slope, soil blowing.	Slope, droughty.
172---------- Hoopeston	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing, rooting depth.	Wetness, too sandy, soil blowing.	Wetness, rooting depth.
188A---------- Beardstown	Severe: seepage.	Severe: piping, wetness.	Frost action---	Wetness--------	Wetness--------	Wetness.
200---------- Orio	Moderate: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding--------	Ponding, too sandy.	Wetness.
201---------- Gilford	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
206--------- Thorp	Severe: seepage.	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
244--------- Hartsburg	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
279A--------- Rozetta	Moderate: seepage.	Slight---------	Deep to water	Erodes easily	Erodes easily	Erodes easily.
279B--------- Rozetta	Moderate: seepage, slope.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280B, 280C2------- Fayette	Moderate: slope, seepage.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280D2, 280E------- Fayette	Severe: slope.	Slight---------	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
284--------- Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Wetness--------	Favorable.
302--------- Ambraw	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
304A--------- Landes	Severe: seepage.	Severe: seepage, piping.	Deep to water	Favorable------	Too sandy, soil blowing.	Rooting depth.
430B, 430C-------- Raddle	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
451--------- Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
567C2--------- Elkhart	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
682--------- Medway	Severe: seepage.	Severe: piping, wetness.	Frost action, flooding.	Wetness, flooding.	Wetness--------	Favorable.
776--------- Comfrey	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
943E, 943G: Seaton----------	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Timula----------	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
962C3: Sylvan----------	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
962C3:						
Bold	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
962D3, 962E2:						
Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Bold	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
962E3:						
Bold	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
965D2, 965E:						
Tallula	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Bold	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
3070 Beaucoup	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding	Wetness.
3073A Ross	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
3115 Dockery	Moderate: seepage.	Moderate: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
4776 Comfrey	Severe: seepage.	Severe: piping, ponding.	Ponding, flooding, frost action.	Ponding, rooting depth, flooding.	Ponding, too sandy.	Wetness, rooting depth.
7070 Beaucoup	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
7078 Arenzville	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
7107 Sawmill	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
7284 Tice	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Favorable.
7302 Ambraw	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
7682 Medway	Severe: seepage.	Severe: piping, wetness.	Frost action	Wetness	Wetness	Favorable.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
8E, 8G----------	0-12	Loam----------	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
Hickory	12-53	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	53-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-5	85-100	75-95	70-95	60-80	20-40	5-20
17A----------	0-14	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
Keomah	14-36	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	100	95-100	45-60	30-45
	36-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-50	15-30
19C3----------	0-8	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
Sylvan	8-29	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	29-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
19D2----------	0-9	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
Sylvan	9-31	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	31-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
19D3----------	0-4	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
Sylvan	4-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	27-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
19E----------	0-4	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
Sylvan	4-10	Silt loam--------	CL, ML	A-4, A-6	0	100	100	100	95-100	30-40	7-15
	10-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	27-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
30F, 30G----------	0-7	Silt loam--------	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5
Hamburg	7-60	Silt loam, very fine sandy loam, silt.	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5
34D----------	0-10	Silt loam--------	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	100	95-100	20-45	NP-20
Tallula	10-26	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	100	90-100	20-40	NP-20
	26-60	Silt loam, silt	CL, CL-ML, ML	A-4, A-6	0	100	100	100	85-100	20-35	NP-15
35D2, 35E2-------	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
Bold	8-60	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
36A----------	0-12	Silt loam--------	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
Tama	12-51	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	51-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
36B, 36C2-------- Tama	0-17	Silt loam---------	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	17-38	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	38-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
37--------------- Worthen	0-31	Silt loam---------	CL	A-4, A-6	0	100	100	95-100	80-100	25-40	7-21
	31-60	Silt loam---------	CL	A-4, A-6	0	100	100	95-100	80-100	25-40	7-21
43A, 43B--------- Ipava	0-10	Silt loam---------	ML, CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-40	10-20
	10-45	Silty clay loam	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	45-60	Silt loam---------	CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-40	5-20
49--------------- Watseka	0-17	Sand--------------	SP, SM, SP-SM	A-3, A-2	0	100	95-100	60-80	3-15	---	NP
	17-60	Sand, loamy sand	SP, SM, SP-SM	A-3, A-2	0	90-100	90-100	60-80	3-25	<20	NP-4
53B, 53D--------- Bloomfield	0-9	Fine sand---------	SM, SP, SP-SM	A-2-4, A-3	0	100	100	60-90	4-20	---	NP
	9-36	Fine sand, loamy fine sand, sand.	SP, SM, SP-SM	A-2-4, A-3	0	100	100	70-90	4-35	---	NP
	36-60	Fine sand, loamy fine sand, fine sandy loam.	SM, SP, SP-SM	A-2-4, A-3	0	100	100	65-90	4-35	<20	NP-3
54B, 54D, 54E---- Plainfield	0-8	Sand--------------	SP-SM, SM, SP	A-3, A-2, A-1	0	75-100	75-100	40-80	3-35	---	NP
	8-32	Sand--------------	SP, SM, SP-SM	A-3, A-1, A-2	0	75-100	75-100	40-70	1-15	---	NP
	32-60	Sand, fine sand	SP, SM, SP-SM	A-3, A-1, A-2	0	75-100	75-100	40-90	1-15	---	NP
68--------------- Sable	0-19	Silty clay loam	CL, CH, ML, MH	A-7	0	100	100	95-100	95-100	41-65	15-35
	19-50	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	50-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	30-40	10-20
70--------------- Beaucoup	0-18	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
	18-50	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	50-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	90-100	60-95	20-40	5-20
71--------------- Darwin	0-21	Silty clay--------	CH, CL	A-7	0	100	100	100	90-100	45-85	25-55
	21-53	Silty clay, clay	CH, CL	A-7	0	100	100	100	85-100	45-85	25-55
	53-60	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	90-100	35-70	20-45
74--------------- Radford	0-12	Silt loam---------	ML, CL	A-4, A-6	0	100	100	95-100	80-100	30-40	5-15
	12-33	Silt loam---------	CL, ML	A-4, A-6	0	100	100	95-100	80-100	25-35	5-15
	33-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	80-95	35-50	15-25
78--------------- Arenzville	0-34	Silt loam---------	ML, CL-ML, CL	A-4	0	100	100	95-100	80-95	20-30	4-10
	34-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	85-95	30-45	10-20

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
81---------- Littleton	0-10	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	90-100	25-40	7-20
	10-36	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	90-100	25-40	7-20
	36-60	Silt loam--------	CL-ML, CL	A-4, A-6, A-7	0	100	100	95-100	80-100	20-45	5-20
87B---------- Dickinson	0-12	Fine sandy loam	SM, SC, SM-SC	A-4, A-2	0	100	100	85-95	30-50	15-30	NP-10
	12-38	Fine sandy loam, sandy loam.	SM, SC, SM-SC	A-4	0	100	100	85-95	35-50	15-30	NP-10
	38-48	Loamy sand, loamy fine sand, fine sand.	SM, SP-SM, SM-SC	A-2, A-3	0	100	100	80-95	5-20	10-20	NP-5
	48-60	Sand, loamy fine sand, loamy sand.	SM, SP-SM	A-3, A-2	0	100	100	70-90	5-20	---	NP
88B---------- Sparta	0-17	Loamy sand-------	SM	A-2, A-4	0	85-100	85-100	50-95	15-50	---	NP
	17-30	Loamy sand, sand	SP-SM, SM	A-2, A-3, A-4	0	85-100	85-100	50-95	5-50	---	NP
	30-60	Sand, fine sand	SP-SM, SM, SP	A-2, A-3	0	85-100	85-100	50-95	2-30	---	NP
107---------- Sawmill	0-10	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	10-29	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	29-52	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	52-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
131B, 131C2, 131D---------- Alvin	0-11	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	11-53	Very fine sandy loam, fine sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	100	90-100	20-80	15-40	NP-15
	53-60	Very fine sand, sandy loam, loam.	SP, SP-SM, SM	A-2, A-3	0	95-100	90-100	70-95	4-35	<20	NP-4
172---------- Hoopeston	0-13	Sandy loam-------	SM	A-2, A-4	0	90-100	90-100	70-90	25-45	20-35	NP-10
	13-36	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	90-100	90-100	60-85	25-50	<30	NP-10
	36-60	Loamy sand, sand	SP-SM, SM, SC, SM-SC	A-2, A-3	0	90-100	90-100	50-80	5-20	<25	NP-10
188A---------- Beardstown	0-9	Loam-------------	CL-ML, CL	A-4, A-6	0	100	100	80-95	50-75	20-30	5-15
	9-14	Loam, silt loam, sandy loam.	CL-ML, CL	A-4, A-6	0	100	100	80-95	50-65	20-30	5-15
	14-41	Clay loam, loam, sandy loam.	CL, ML	A-6, A-4	0	100	100	80-90	50-70	25-40	7-20
	41-60	Stratified loamy sand to loam.	SM, SM-SC	A-2, A-4, A-1	0	100	100	20-50	15-45	<15	NP-5
200---------- Orio	0-9	Loam-------------	CL-ML, CL	A-4, A-6	0	100	100	75-90	50-85	25-40	5-15
	9-22	Loam, sandy loam, loamy sand.	SM, SC, ML, CL	A-4, A-2-4	0	100	100	75-90	15-60	<35	2-10
	22-45	Sandy loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	100	100	80-95	35-75	30-45	10-20
	45-60	Stratified loam to loamy sand.	SM-SC, SC	A-4, A-2-4, A-6, A-2-6	0	100	100	75-90	15-45	25-35	5-15

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
201---------- Gilford	0-18	Sandy loam-------	SC, SM-SC	A-4, A-2-4	0	95-100	90-100	60-70	30-40	20-30	4-10
	18-31	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2-4	0	90-100	90-100	55-70	20-35	15-30	NP-8
	31-60	Loamy sand, sand	SM, SP, SP-SM	A-3, A-1-b, A-2-4	0	90-100	85-100	18-60	3-20	---	NP
206---------- Thorp	0-19	Silt loam--------	CL	A-6, A-4	0	95-100	95-100	90-100	75-95	20-40	8-19
	19-50	Silty clay loam	CL	A-7, A-6	0	95-100	95-100	90-100	75-95	35-50	13-27
	50-60	Silt loam, clay loam, loam.	CL	A-6, A-4, A-7	0	90-100	90-100	90-100	70-90	20-50	8-26
244---------- Hartsburg	0-17	Silty clay loam	CL, ML	A-7, A-6	0	100	100	100	95-100	35-50	10-25
	17-34	Silty clay loam	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-30
	34-60	Silt loam, loam	CL	A-6	0	95-100	90-100	90-100	70-100	25-40	11-20
279A, 279B------- Rozetta	0-10	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
	10-15	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	15-33	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	33-60	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	85-100	25-40	7-20
280B, 280C2, 280D2, 280E----- Fayette	0-12	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	12-56	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	56-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
284---------- Tice	0-19	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
	19-53	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
	53-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	100	100	60-95	55-80	25-45	5-20
302---------- Ambraw	0-17	Clay loam--------	CL	A-6, A-7	0	100	100	85-95	70-95	30-45	10-20
	17-30	Clay loam--------	CL, CH	A-6, A-7	0	100	100	80-90	60-80	35-55	15-30
	30-35	Clay loam, loam	CL	A-7, A-6	0	100	100	85-95	50-85	30-50	10-25
	35-60	Stratified clay loam to sandy loam.	SC, ML, CL, SM	A-6, A-4	0	100	90-100	80-90	40-80	20-40	NP-17
304A---------- Landes	0-14	Fine sandy loam	SM, SC, SM-SC	A-4, A-2	0	100	70-100	70-95	20-50	<25	NP-10
	14-32	Loam, fine sandy loam, sandy loam.	SM, CL-ML, SC, SM-SC	A-2, A-4	0	100	85-100	70-95	15-60	<25	NP-10
	32-60	Stratified sand to sandy loam.	SM, SP-SM, SC, SM-SC	A-2, A-4	0	100	85-100	70-85	10-50	<30	NP-10
430B, 430C------- Raddle	0-16	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	85-100	25-35	8-15
	16-60	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	20-30	4-14
451---------- Lawson	0-9	Silt loam--------	CL, CL-ML	A-4	0	100	100	90-100	85-100	20-30	5-10
	9-27	Silt loam--------	CL, CL-ML	A-4	0	100	100	90-100	85-100	20-30	5-10
	27-60	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	60-100	20-40	10-25
567C2---------- Elkhart	0-11	Silt loam--------	CL	A-4, A-6	0	100	100	100	95-100	25-35	8-15
	11-34	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	18-30
	34-60	Silt loam, silt	CL	A-6, A-4	0	100	100	95-100	95-100	20-37	8-20

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
682---------- Medway	0-15	Loam----------	ML, CL, CL-ML	A-4, A-6	0	100	100	90-100	70-80	20-40	3-15
	15-38	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	80-95	75-90	70-90	20-45	4-20
	38-60	Stratified loamy sand to silty clay loam.	ML, CL, SM-SC, SM	A-4, A-2, A-6	0	90-100	75-100	45-95	25-75	15-30	NP-15
776---------- Comfrey	0-7	Clay loam--------	OH, ML, CL, CH	A-7	0	100	100	90-100	65-95	40-55	15-25
	7-30	Clay loam, loam	OL, OH, MH, ML	A-7	0	100	100	85-100	65-85	45-60	12-25
	30-60	Clay loam, loam	CL	A-7, A-6	0	100	100	80-100	60-85	35-50	12-25
943E, 943G:											
Seaton----------	0-6	Silt loam--------	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	100	95-100	20-45	5-20
	6-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
Timula----------	0-21	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	85-100	25-35	NP-10
	21-60	Silt loam, silt	ML, CL-ML	A-4	0	100	100	95-100	85-100	25-35	NP-10
962C3, 962D3:											
Sylvan----------	0-8	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
	8-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	27-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
Bold----------	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
	9-60	Silt loam, silt	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
962E2:											
Sylvan----------	0-6	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	6-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	28-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
Bold----------	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
	10-60	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
962E3:											
Bold----------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
	6-60	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
Sylvan----------	0-6	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
	6-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	28-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
965D2, 965E:											
Tallula----------	0-12	Silt loam--------	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	100	95-100	20-45	NP-20
	12-31	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	100	90-100	20-40	NP-20
	31-60	Silt loam, silt	CL, CL-ML, ML	A-4, A-6	0	100	100	100	85-100	20-35	NP-15

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
965D2, 965E:											
Bold	0-8	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
	8-60	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
3070	0-23	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
Beaucoup	23-32	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	32-39	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	90-100	65-95	25-45	5-25
	39-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	90-100	60-95	20-40	5-20
3073A	0-29	Loam	ML, CL-ML, CL	A-4, A-6	0	90-100	90-100	80-100	65-95	20-35	NP-12
Ross	29-53	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	90-100	85-100	70-100	55-95	22-45	3-20
	53-60	Loamy sand	CL, ML, SM, GM	A-6, A-4, A-2, A-1	0-5	65-100	45-100	30-100	25-80	<30	NP-12
3115	0-8	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	90-100	85-100	25-35	5-15
Dockery	8-60	Stratified silt loam to silty clay loam.	CL	A-4, A-6	0	100	100	90-100	85-95	25-40	8-20
4776	0-11	Loam	ML, CL	A-6, A-7	0	100	100	85-95	70-95	30-45	10-20
Comfrey	11-30	Clay loam, loam	ML, CL	A-7, A-6	0	100	100	85-95	50-85	30-50	10-25
	30-60	Stratified clay loam to sand.	ML, CL, SM, SC	A-6, A-4, A-2	0	100	90-100	70-90	30-75	15-35	NP-20
7070	0-19	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
Beaucoup	19-38	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	38-47	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	90-100	65-95	25-45	5-25
	47-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	90-100	60-95	20-40	5-20
7078	0-36	Silt loam	ML, CL-ML, CL	A-4	0	100	100	95-100	80-95	20-30	4-10
Arenzville	36-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	85-95	30-45	10-20
7107	0-21	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
Sawmill	21-34	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	34-57	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	57-60	Silty clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
7284	0-17	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
Tice	17-31	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
	31-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	100	100	60-95	55-80	25-45	5-20

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
7302---------- Ambraw	0-14	Clay loam--------	CL	A-6, A-7	0	100	100	85-95	70-95	30-45	10-20
	14-28	Clay loam--------	CL, CH	A-6, A-7	0	100	100	80-90	60-80	35-55	15-30
	28-38	Clay loam, loam	CL	A-7, A-6	0	100	100	85-95	50-85	30-50	10-25
	38-60	Stratified clay loam to sandy loam.	SC, ML, CL, SM	A-6, A-4	0	100	90-100	80-90	40-80	20-40	NP-17
7682---------- Medway	0-17	Loam----------	ML, CL, CL-ML	A-4, A-6	0	100	100	90-100	70-80	20-40	3-15
	17-54	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	80-95	75-90	70-90	20-45	4-20
	54-60	Stratified gravelly sandy loam to silty clay loam.	ML, CL, SM, SC	A-2, A-4, A-6, A-1-b	0-5	80-100	65-100	35-95	20-75	15-30	NP-15

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
8E, 8G----------	0-12	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37	5	6	1-2
Hickory	12-53	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-----	0.37			
	53-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.37			
17A---------	0-14	16-22	1.30-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	6	1-2
Keomah	14-36	27-42	1.30-1.45	0.06-0.6	0.18-0.20	4.5-5.5	High---------	0.37			
	36-60	24-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-6.5	Moderate-----	0.37			
19C3---------	0-8	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	4	7	<1
Sylvan	8-29	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	29-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
19D2---------	0-9	20-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37	5	6	1-2
Sylvan	9-31	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	31-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
19D3---------	0-4	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	4	7	<1
Sylvan	4-27	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	27-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
19E---------	0-4	18-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	1-2
Sylvan	4-10	15-25	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
	10-27	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	27-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
30F, 30G----------	0-7	6-12	1.20-1.30	0.6-2.0	0.20-0.24	6.6-8.4	Low----------	0.43	5	4L	.5-2
Hamburg	7-60	6-12	1.20-1.30	0.6-2.0	0.17-0.22	7.4-8.4	Low----------	0.43			
34D---------	0-10	10-20	1.10-1.30	0.6-2.0	0.22-0.24	6.6-7.8	Low----------	0.32	5	5	2-3
Tallula	10-26	12-18	1.10-1.30	0.6-2.0	0.20-0.22	6.6-7.8	Low----------	0.43			
	26-60	8-18	1.10-1.50	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
35D2, 35E2-------	0-8	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43	5	4L	.5-2
Bold	8-60	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43			
36A---------	0-12	20-27	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.32	5	7	3-4
Tama	12-51	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	51-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
36B, 36C2--------	0-17	24-27	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.32	5	7	3-4
Tama	17-38	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	38-60	22-28	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
37----------	0-31	15-22	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	3-4
Worthen	31-60	18-24	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.43			
43A, 43B----------	0-10	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
Ipava	10-45	35-40	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.43			
	45-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
49----------	0-17	2-8	1.50-1.70	6.0-20	0.07-0.09	5.6-7.3	Low----------	0.17	5	1	1-2
Watseka	17-60	1-10	1.70-2.00	6.0-20	0.05-0.10	5.1-7.3	Low----------	0.17			
53B, 53D----------	0-9	2-10	1.60-1.80	6.0-20	0.07-0.09	5.1-7.3	Low----------	0.15	5	1	.5-2
Bloomfield	9-36	2-10	1.60-1.80	6.0-20	0.06-0.11	5.1-7.3	Low----------	0.15			
	36-60	5-13	1.60-1.80	6.0-20	0.05-0.10	5.1-7.8	Low----------	0.15			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
54B, 54D, 54E----	0-8	2-5	1.50-1.65	6.0-20	0.04-0.09	4.5-7.3	Low----------	0.15	5	1	<1
Plainfield	8-32	0-4	1.50-1.65	6.0-20	0.04-0.07	4.5-6.5	Low----------	0.17			
	32-60	0-4	1.50-1.70	6.0-20	0.04-0.07	4.5-6.5	Low----------	0.17			
68----------	0-19	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	6	5-6
Sable	19-50	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.28			
	50-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.28			
70----------	0-18	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	18-50	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	50-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			
71----------	0-21	40-45	1.20-1.40	<0.06	0.11-0.14	6.1-7.8	Very high----	0.28	3	4	4-5
Darwin	21-53	45-60	1.30-1.50	<0.06	0.11-0.14	6.1-7.8	Very high----	0.28			
	53-60	30-55	1.40-1.60	0.06-0.2	0.10-0.20	6.6-8.4	High---------	0.28			
74----------	0-12	18-27	1.40-1.60	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	2-4
Radford	12-33	18-27	1.40-1.60	0.6-2.0	0.20-0.22	6.1-7.8	Low----------	0.28			
	33-60	24-35	1.35-1.55	0.6-2.0	0.18-0.20	6.6-7.8	Moderate-----	0.28			
78----------	0-34	10-18	1.20-1.55	0.6-2.0	0.20-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
Arenzville	34-60	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Moderate-----	0.37			
81----------	0-10	18-27	1.20-1.45	0.6-2.0	0.20-0.24	5.6-7.8	Low----------	0.32	5	6	3-4
Littleton	10-36	22-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.32			
	36-60	18-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.43			
87B----------	0-12	10-18	1.50-1.55	2.0-6.0	0.12-0.15	5.6-7.3	Low----------	0.20	4	3	1-2
Dickinson	12-38	10-15	1.45-1.55	2.0-6.0	0.12-0.15	5.1-6.5	Low----------	0.20			
	38-48	4-10	1.55-1.65	6.0-20	0.08-0.10	5.1-6.5	Low----------	0.20			
	48-60	4-10	1.60-1.70	6.0-20	0.02-0.04	5.6-6.5	Low----------	0.15			
88B----------	0-17	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low----------	0.17	5	2	1-2
Sparta	17-30	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-6.5	Low----------	0.17			
	30-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-6.0	Low----------	0.17			
107----------	0-10	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
Sawmill	10-29	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	29-52	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	52-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
131B, 131C2, 131D----------	0-11	10-15	1.45-1.65	2.0-6.0	0.14-0.20	4.5-7.3	Low----------	0.24	5	3	.5-1
Alvin	11-53	15-18	1.45-1.65	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.24			
	53-60	3-10	1.55-1.75	2.0-6.0	0.05-0.13	5.1-7.8	Low----------	0.24			
172----------	0-13	8-18	1.35-1.70	2.0-6.0	0.12-0.15	5.1-6.5	Low----------	0.20	4	3	2-3
Hoopeston	13-36	12-18	1.45-1.75	2.0-6.0	0.12-0.17	5.1-7.8	Low----------	0.28			
	36-60	2-10	1.50-1.80	6.0-20	0.05-0.10	4.5-8.4	Low----------	0.17			
188A----------	0-9	15-27	1.20-1.40	0.6-2.0	0.17-0.24	5.6-7.3	Low----------	0.32	5	5	2-4
Beardstown	9-14	15-27	1.25-1.40	0.6-2.0	0.17-0.22	5.1-6.0	Low----------	0.32			
	14-41	18-30	1.40-1.60	0.2-2.0	0.15-0.19	4.5-6.0	Low----------	0.32			
	41-60	5-15	1.40-1.65	2.0-6.0	0.08-0.17	5.1-7.3	Low----------	0.17			
200----------	0-9	10-20	1.25-1.45	0.6-2.0	0.20-0.24	4.5-7.8	Low----------	0.28	5	5	1-2
Orio	9-22	6-20	1.30-1.50	0.6-2.0	0.09-0.18	4.5-7.8	Low----------	0.28			
	22-45	18-30	1.40-1.60	0.2-0.6	0.12-0.19	4.5-7.8	Moderate-----	0.28			
	45-60	10-22	1.50-1.70	0.6-2.0	0.09-0.17	4.5-7.8	Low----------	0.28			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
201----------	0-18	10-20	1.50-1.70	2.0-6.0	0.13-0.15	5.6-7.3	Low----------	0.20	4	3	2-4
Gilford	18-31	8-17	1.60-1.80	2.0-6.0	0.12-0.14	5.6-7.3	Low----------	0.20			
	31-60	3-12	1.70-1.90	6.0-20	0.05-0.08	6.1-7.3	Low----------	0.15			
206----------	0-19	20-27	1.15-1.35	0.2-0.6	0.22-0.24	5.1-7.8	Low----------	0.37	4	6	4-6
Thorp	19-50	27-35	1.35-1.55	0.06-0.2	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	50-60	20-30	1.40-1.60	0.06-0.2	0.15-0.22	5.6-7.8	Moderate-----	0.37			
244----------	0-17	27-33	1.15-1.35	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.28	5	4	3-5
Hartsburg	17-34	27-35	1.20-1.50	0.6-2.0	0.18-0.20	6.6-8.4	Moderate-----	0.28			
	34-60	20-27	1.30-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.28			
279A, 279B-------	0-10	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
Rozetta	10-15	12-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37			
	15-33	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	33-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
280B, 280C2,											
280D2, 280E-----	0-12	15-25	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	5	6	1-2
Fayette	12-56	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	56-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.37			
284----------	0-19	27-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
Tice	19-53	22-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	53-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			
302----------	0-17	27-35	1.40-1.60	0.6-2.0	0.17-0.23	5.6-7.3	Moderate-----	0.28	5	6	2-3
Ambraw	17-30	30-40	1.45-1.65	0.2-0.6	0.09-0.11	5.1-7.3	Moderate-----	0.28			
	30-35	24-35	1.45-1.65	0.2-2.0	0.15-0.19	5.1-7.3	Moderate-----	0.28			
	35-60	18-30	1.50-1.70	0.2-2.0	0.11-0.22	6.1-8.4	Low----------	0.28			
304A----------	0-14	7-20	1.40-1.60	2.0-6.0	0.13-0.20	6.1-8.4	Low----------	0.20	5	3	1-2
Landes	14-32	5-18	1.45-1.70	2.0-6.0	0.10-0.15	6.1-8.4	Low----------	0.32			
	32-60	5-18	1.60-1.80	6.0-20	0.05-0.15	6.1-8.4	Low----------	0.20			
430B, 430C-------	0-16	18-24	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-4
Raddle	16-60	18-24	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.43			
451----------	0-9	10-20	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	5	5	3-5
Lawson	9-27	10-20	1.20-1.55	0.6-2.0	0.20-0.22	6.1-7.8	Low----------	0.28			
	27-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
567C2----------	0-11	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.32	5	6	2-4
Elkhart	11-34	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-8.4	Moderate-----	0.43			
	34-60	20-27	1.35-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
682----------	0-15	18-27	1.20-1.45	0.6-2.0	0.17-0.22	6.1-7.8	Low----------	0.32	5	6	3-6
Medway	15-38	18-32	1.20-1.50	0.6-2.0	0.14-0.18	6.1-8.4	Low----------	0.32			
	38-60	5-30	1.20-1.60	0.6-6.0	0.11-0.15	6.1-8.4	Low----------	0.32			
776----------	0-7	28-35	1.20-1.40	0.6-2.0	0.18-0.22	6.6-7.8	Moderate-----	0.28	5	6	6-10
Comfrey	7-30	18-35	1.20-1.40	0.6-2.0	0.16-0.20	6.6-7.8	Moderate-----	0.28			
	30-60	18-35	1.30-1.50	0.6-2.0	0.15-0.19	6.6-8.4	Moderate-----	0.28			
943E, 943G:											
Seaton----------	0-6	10-22	1.10-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	1-3
	6-60	18-27	1.20-1.60	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37			
Timula----------	0-21	10-18	1.30-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low----------	0.37	5	5	1-2
	21-60	10-18	1.40-1.60	0.6-2.0	0.18-0.20	7.4-8.4	Low----------	0.37			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
962C3:											
Sylvan----------	0-8	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	4	7	<1
	8-27	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	27-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
Bold----------	0-7	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43	4	4L	.5-2
	7-60	8-15	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43			
962D3:											
Sylvan----------	0-8	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	4	7	<1
	8-27	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	27-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
Bold----------	0-9	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43	4	4L	.5-2
	9-60	8-15	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43			
962E2:											
Sylvan----------	0-6	20-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37	5	6	1-2
	6-28	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	28-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
Bold----------	0-10	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43	5	4L	.5-2
	10-60	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43			
962E3:											
Bold----------	0-6	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43	4	4L	.5-2
	6-60	8-15	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43			
Sylvan----------	0-6	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	4	7	<1
	6-28	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	28-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
965D2, 965E:											
Tallula----------	0-12	10-20	1.10-1.30	0.6-2.0	0.22-0.24	6.6-7.8	Low----------	0.32	5	5	2-3
	12-31	12-18	1.10-1.30	0.6-2.0	0.20-0.22	6.6-7.8	Low----------	0.43			
	31-60	8-18	1.10-1.50	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
Bold----------	0-8	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43	5	4L	.5-2
	8-60	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low----------	0.43			
3070----------	0-23	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	23-32	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	32-39	15-30	1.35-1.55	0.2-0.6	0.18-0.22	5.6-7.8	Moderate-----	0.32			
	39-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			
3073A----------	0-29	15-27	1.20-1.45	0.6-2.0	0.19-0.24	6.1-7.8	Low----------	0.32	5	5	3-5
Ross	29-53	18-32	1.20-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Low----------	0.32			
	53-60	5-25	1.35-1.60	0.6-6.0	0.05-0.18	6.1-8.4	Low----------	0.32			
3115----------	0-8	15-27	1.35-1.45	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.37	5	6	2-4
Dockery	8-60	18-30	1.35-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Moderate-----	0.37			
4776----------	0-11	25-27	1.25-1.45	0.6-2.0	0.18-0.22	6.1-7.8	Moderate-----	0.28	5	6	4-8
Comfrey	11-30	20-35	1.30-1.50	0.6-2.0	0.16-0.20	6.6-7.8	Moderate-----	0.28			
	30-60	5-30	1.45-1.75	0.6-6.0	0.07-0.19	6.6-7.8	Low----------	0.28			
7070----------	0-19	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	19-38	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	38-47	15-30	1.35-1.55	0.2-0.6	0.18-0.22	5.6-7.8	Moderate-----	0.32			
	47-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
7078----------	0-36	10-18	1.20-1.55	0.6-2.0	0.20-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
Arenzville	36-60	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Moderate-----	0.37			
7107----------	0-21	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
Sawmill	21-34	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	34-57	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	57-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
7284----------	0-17	27-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
Tice	17-31	22-35	1.30-1.50	0.6-2.0	0.18-0.21	5.6-7.8	Moderate-----	0.32			
	31-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			
7302----------	0-14	27-35	1.40-1.60	0.6-2.0	0.17-0.23	5.6-7.3	Moderate-----	0.28	5	6	2-3
Ambraw	14-28	30-40	1.45-1.65	0.2-0.6	0.09-0.11	5.1-7.3	Moderate-----	0.28			
	28-38	24-35	1.45-1.65	0.2-2.0	0.15-0.19	5.1-7.3	Moderate-----	0.28			
	38-60	18-30	1.50-1.70	0.2-2.0	0.11-0.22	6.1-8.4	Low----------	0.28			
7682----------	0-15	18-27	1.20-1.45	0.6-2.0	0.17-0.22	6.1-7.8	Low----------	0.32	5	6	3-6
Medway	15-49	18-32	1.20-1.50	0.6-2.0	0.14-0.18	6.1-8.4	Low----------	0.32			
	49-60	5-30	1.20-1.60	0.6-6.0	0.08-0.15	6.1-8.4	Low----------	0.32			

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
8E, 8G---------- Hickory	C	None--------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
17A---------- Keomah	C	None--------	---	---	2.0-4.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
19C3, 19D2, 19D3, 19E---------- Sylvan	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
30F, 30G---------- Hamburg	B	None--------	---	---	>6.0	---	---	High-----	Low------	Low.
34D---------- Tallula	B	None--------	---	---	>6.0	---	---	High-----	Low------	Low.
35D2, 35E2-------- Bold	B	None--------	---	---	>6.0	---	---	High-----	Low------	Low.
36A---------- Tama	B	None--------	---	---	4.0-6.0	Apparent	Mar-Jun	High-----	Moderate	Moderate.
36B, 36C2--------- Tama	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
37---------- Worthen	B	None--------	---	---	>6.0	---	---	High-----	Low------	Low.
43A, 43B---------- Ipava	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
49---------- Watseka	B	None--------	---	---	1.0-3.0	Apparent	Mar-May	Moderate	Low------	High.
53B, 53D---------- Bloomfield	A	None--------	---	---	>6.0	---	---	Low------	Low------	High.
54B, 54D, 54E----- Plainfield	A	None--------	---	---	>6.0	---	---	Low------	Low------	High.
68---------- Sable	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
70---------- Beaucoup	B/D	Frequent----	Long------	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
71---------- Darwin	D	Rare--------	---	---	+1-2.0	Apparent	Jan-Jun	Moderate	High-----	Low.
74---------- Radford	B	Frequent----	Brief-----	Mar-Jun	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Low.
78---------- Arenzville	B	Frequent----	Brief-----	Mar-Jun	3.0-6.0	Apparent	Mar-Jun	High-----	Moderate	Moderate.
81---------- Littleton	B	Rare--------	---	---	1.0-3.0	Apparent	Apr-Jun	High-----	High-----	Low.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
87E---------- Dickinson	B	None--------	---	---	>6.0	---	---	Moderate	Low------	Moderate.
88B---------- Sparta	A	None--------	---	---	>6.0	---	---	Low------	Low------	Moderate.
107---------- Sawmill	B/D	Frequent----	Long------	Mar-Jun	0-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
131B, 131C2, 131D- Alvin	B	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
172---------- Hoopeston	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	Low------	Moderate.
188A---------- Beardstown	C	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	High.
200---------- Orio	B/D	None--------	---	---	+.5-1.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
201---------- Gilford	B/D	None--------	---	---	+.5-1.0	Apparent	Mar-May	High-----	High-----	Moderate.
206---------- Thorp	C/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
244---------- Hartsburg	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
279A, 279B-------- Rozetta	B	None--------	---	---	4.0-6.0	Apparent	Mar-Jun	High-----	Moderate	Moderate.
280B, 280C2, 280D2, 280E------ Fayette	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
284---------- Tice	B	Frequent----	Long------	Mar-Jun	1.5-3.0	Apparent	Mar-Jun	High-----	High-----	Low.
302---------- Ambraw	B/D	Frequent----	Long------	Mar-Jun	0-2.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
304A---------- Landes	B	Frequent----	Brief-----	Mar-May	>6.0	---	---	Moderate	Low------	Low.
430B, 430C-------- Raddle	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
451---------- Lawson	C	Frequent----	Brief-----	Mar-Jun	1.0-3.0	Apparent	Mar-May	High-----	Moderate	Low.
567C2---------- Elkhart	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
682---------- Medway	B	Frequent----	Long------	Mar-Jun	1.5-3.0	Apparent	Mar-Apr	High-----	High-----	Low.
776---------- Comfrey	B/D	Frequent----	Long------	Mar-Jun	0-3.0	Apparent	Apr-Jul	High-----	High-----	Low.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
943E, 943G:										
Seaton	B	None	---	---	>6.0	---	---	High	Low	Moderate.
Timula	B	None	---	---	>6.0	---	---	High	Low	Low.
962C3, 962D3, 962E2:										
Sylvan	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
Bold	B	None	---	---	>6.0	---	---	High	Low	Low.
962E3:										
Bold	B	None	---	---	>6.0	---	---	High	Low	Low.
Sylvan	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
965D2, 965E:										
Tallula	B	None	---	---	>6.0	---	---	High	Low	Low.
Bold	B	None	---	---	>6.0	---	---	High	Low	Low.
3070, Beaucoup	B/D	Frequent	Long	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	High	High	Low.
3073A, Ross	B	Frequent	Brief	Mar-Jun	4.0-6.0	Apparent	Mar-Apr	Moderate	Low	Low.
3115, Dockery	C	Frequent	Long	Mar-Jun	2.0-3.0	Apparent	Mar-Apr	High	Moderate	Low.
4776, Comfrey	D	Frequent	Long	Mar-Jun	+2-1.0	Apparent	Jan-Dec	High	High	Low.
7070, Beaucoup	B/D	Rare	---	---	+.5-2.0	Apparent	Mar-Jun	High	High	Low.
7078, Arenzville	B	Rare	---	---	3.0-6.0	Apparent	Mar-Jun	High	Moderate	Moderate.
7107, Sawmill	B/D	Rare	---	---	0-2.0	Apparent	Mar-Jun	High	High	Low.
7284, Tice	B	Rare	---	---	1.5-3.0	Apparent	Mar-Jun	High	High	Low.
7302, Ambraw	B/D	Rare	---	---	0-2.0	Apparent	Mar-Jun	High	High	Moderate.
7682, Medway	B	Rare	---	---	1.5-3.0	Apparent	Mar-Apr	High	High	Low.

(Dashes indicate that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; UN, Unified; and NP, nonplastic)

Soil name and location	Sample number 81-IL-017-	Horizon designator	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ft^3	Pct					Pct			
Arenzville silt loam: 930 feet north, 120 feet east of center, sec. 27, T. 18 N., R. 11 W.	7-1	Ap	0-6	107	12	100	100	100	98	29	5	A-4(5)	ML
	7-3	C2	14-36	109	17	100	100	100	99	28	5	A-4(5)	ML
	7-4	Ab1	36-45	105	19	100	100	100	99	34	11	A-6(11)	CL
	7-6	Ab3	56-60	100	22	100	100	100	99	46	21	A-7-6 (24)	CL
Beaucoup silty clay loam: 890 feet north, 1,170 feet east of southwest corner, sec. 32, T. 17 N., R. 12 W.	62-1	Ap	0-10	103	19	100	100	99	90	37	14	A-6(13)	CL
	62-2	A	10-18	107	18	100	100	100	93	42	21	A-7-6 (21)	CL
	62-5	Bg2	32-41	108	18	100	100	98	94	43	22	A-7-6 (22)	CL
	62-7	Cg	50-60	122	12	100	100	99	43	21	6	A-4	CL-ML
Bloomfield fine sand: 2,510 feet south, 610 feet west of northeast corner, sec. 33, T. 18 N., R. 11 W.	63-1	Ap	0-9	113	11	100	100	98	14	---	NP	A-2-4 (0)	SM
	63-2	E	9-36	114	12	100	100	99	18	---	NP	A-2-4 (0)	SM
	63-3	E&Bt (E part)	36-60	116	10	100	100	99	20	---	NP	A-2-4 (0)	SM
	63-4	E&Bt (Bt part)	36-60	124	11	100	100	98	27	---	NP	A-2-4 (0)	SM
Bold silt loam: 2,800 feet south, 675 feet west of northeast corner, sec. 3, T. 17 N., R. 9 W.	30-1	Ap	0-9	103	19	100	100	100	99	36	13	A-6(14)	CL
	30-4	C3	30-60	107	16	100	100	100	99	26	1	A-4(0)	ML
Sparta sand: 1,710 feet north, 2,330 feet west of southeast corner, sec. 35, T. 18 N., R. 21 W.	6-1	Ap	0-8	113	11	100	100	90	12	---	NP	A-2-4 (0)	SM
	6-4	Bw1	21-30	115	10	100	100	94	16	---	NP	A-2-4 (0)	SM-SW
	6-5	Bw2	30-40	113	12	100	100	94	12	---	NP	A-2-4 (0)	SM
	6-6	C	40-60	108	14	100	100	96	7	---	NP	A-3	SM-SW
Tallula silt loam: 1,330 feet south, 155 feet east of northwest corner, sec. 4, T. 17 N., R. 10 W.	23-4	Bw	16-26	105	20	100	100	99	98	38	13	A-6(15)	CL
	23-6	C2	31-60	108	17	100	99	99	98	28	4	A-4(04)	ML
Watseka sand: 260 feet south, 205 feet east of center, sec. 4, T. 17 N., R. 12 W.	48-1	Ap	0-7	113	10	100	100	93	11	---	NP	A-2-4 (0)	SM-SW
	48-4	Bw	22-28	115	11	100	100	95	16	---	NP	A-2-4 (0)	SM
	48-6	C	36-60	110	12	100	100	93	9	---	NP	A-3(0)	SM-SW

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
Ambraw	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls
Arenzville	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Beardstown	Fine-loamy, mixed, mesic Udollic Ochraqualfs
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
*Bloomfield	Sandy, mixed, mesic Psammentic Hapludalfs
Bold	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Comfrey	Fine-loamy, mixed, mesic Cumulic Haplaquolls
Darwin	Fine, montmorillonitic, mesic Vertic Haplaquolls
Dickinson	Coarse-loamy, mixed, mesic Typic Hapludolls
Dockery	Fine-silty, mixed, nonacid, mesic Aquic Udifluvents
Elkhart	Fine-silty, mixed, mesic Typic Argiudolls
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Gilford	Coarse-loamy, mixed, mesic Typic Haplaquolls
Hamburg	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Hartsburg	Fine-silty, mixed, mesic Typic Haplaquolls
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Hoopeston	Coarse-loamy, mixed, mesic Aquic Hapludolls
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Landes	Coarse-loamy, mixed, mesic Fluventic Hapludolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Littleton	Fine-silty, mixed, mesic Cumulic Hapludolls
Medway	Fine-loamy, mixed, mesic Fluvaquentic Hapludolls
Orio	Fine-loamy, mixed, mesic Mollic Ochraqualfs
Plainfield	Mixed, mesic Typic Udipsamments
Raddle	Fine-silty, mixed, mesic Typic Hapludolls
Radford	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Seaton	Fine-silty, mixed, mesic Typic Hapludalfs
Sparta	Sandy, mixed, mesic Entic Hapludolls
Sylvan	Fine-silty, mixed, mesic Typic Hapludalfs
Tallula	Coarse-silty, mixed, mesic Typic Hapludolls
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Thorp	Fine-silty, mixed, mesic Argiaquic Argialbolls
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Timula	Coarse-silty, mixed, mesic Typic Eutrochrepts
Watseka	Sandy, mixed, mesic Aquic Hapludolls
Worthen	Fine-silty, mixed, mesic Cumulic Hapludolls

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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