United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Purdue University Agricultural Experiment Station and United States Department of Agriculture, Forest Service

Soil Survey of Perry County, Indiana

How To Use This Soil Survey

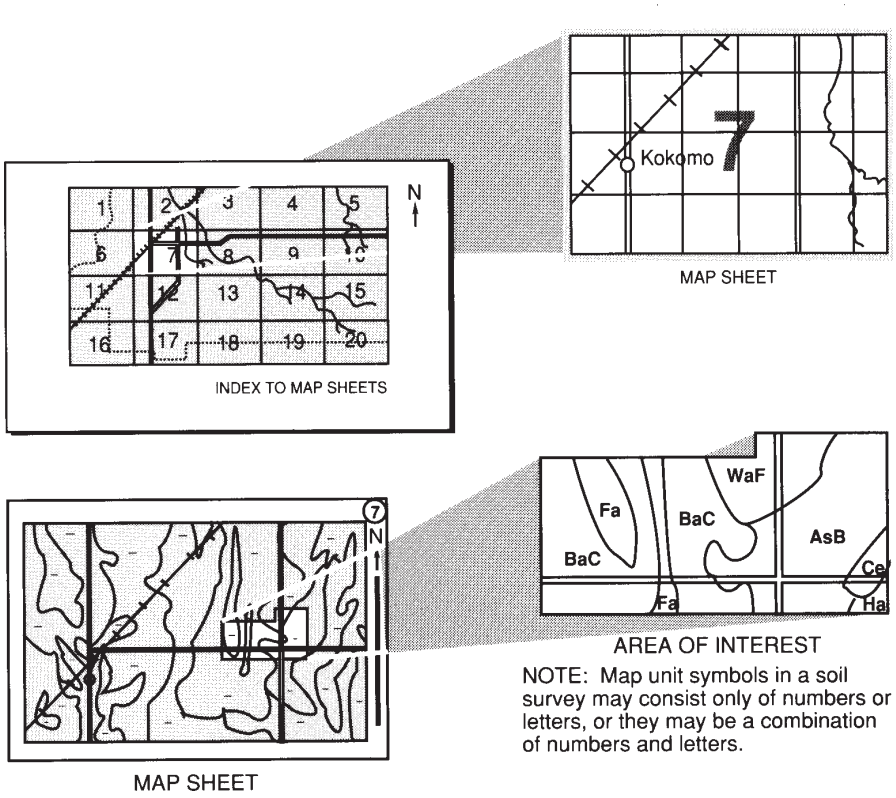
Detailed Soil Maps

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

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

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

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



This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1996. Soil names and descriptions were approved in 1997. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1996. This survey was made cooperatively by the Natural Resources Conservation Service; the United States Department of Agriculture, Forest Service; and the Purdue University Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Perry County Soil and Water Conservation District.

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

Cover: These cattle are grazing on fescue that is growing in an area of Ebal-Deuchars-Kitterman complex, 12 to 24 percent slopes, eroded. These soils are suited to growing grasses and legumes for hay and pasture. These soils require careful management to minimize the erosion hazard.

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

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Issued 2006

Foreword

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

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

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

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

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

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Soil Survey of
Perry County, Indiana

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United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
Purdue University Agricultural Experiment Station and the United States Department of Agriculture, Forest Service

PERRY COUNTY is in the south-central part of Indiana (fig. 1). The survey area is in major land resource area (MLRA) 120, Kentucky and Indiana Sandstone and Shale Hills and Valleys. It has a total area of 386 square miles, or 246,886 acres. Tell City is the county seat. Tell City, Cannelton, and Troy are the largest cities. In 1996, Tell City had a population of about 8,007. In 1996, the population of the county was about 19,210 (U.S. Department of Commerce, 1990). About 56,000 acres of the county is in the Hoosier National Forest. Smaller acreages are in State-owned forests.

The primary farm enterprises are cash grain crops and the production of livestock. Corn, soybeans, and winter wheat are the main cash grain crops. Several acres are used for growing tobacco. Hogs and beef cattle are the main livestock raised. There are a few dairy operations in the county.

This soil survey updates and refines the soil survey of Perry County published in 1969 (USDA, 1969). It provides larger maps, which show the soils in greater detail. It also provides additional information about soil interpretations.

General Nature of the Survey Area

This section gives general information about the physical and cultural features of the county. It describes the history and development; climate; and physiography, relief, and drainage.

History and Development

As early as 1800, Troy was a primary stopping point for early settlers, and was the first important settlement and the first county seat. Troy was the county seat from 1814 to 1819, Rome was the county seat from 1819 to 1859, and Cannelton was the county seat from 1859 to 1994. In 1994, the county seat was moved to Tell City. The character of Perry County was formed by the variety of people who settled there. The area has a strong Germanic background, because many of that nationality traveled down the Ohio River in search of new territory to settle. The Swiss, settling mainly in Tell City, arrived later. There is an Irish influence in Cannelton. Most of the early settlers were farmers. Industries related to the vast forests were developed at a later date. Coal mining was an important industry in the Cannelton area, and the remains of many small “slope mines” dot the landscape in the western and southern parts of the county.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Saint Meinrad, Indiana, in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

Figure 1.—Location of Perry County in Indiana.

In winter, the average temperature is 34.3 degrees F and the average daily minimum temperature is 24.8 degrees. The lowest temperature on record, which occurred at Saint Meinrad on January 17, 1977, was -22 degrees. In summer, the average temperature is 75.1 degrees and the average daily maximum temperature is 86.4 degrees. The highest recorded temperature, which occurred at Saint Meinrad on July 14, 1966, is 104 degrees.

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

The average annual total precipitation is 45.25 inches. Of this total, about 24.48 inches, or 54 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 4.44 inches at Saint Meinrad on May 8, 1961. Thunderstorms occur on about 45 days each year, and most occur in July.

The average seasonal snowfall is 10.8 inches. The greatest snow depth at any one time during the period of record was 18 inches recorded on January 17, 1978. On an average, 13 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 11 inches recorded on February 1, 1966.

The average relative humidity in midafternoon is about 61 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 66 percent of the time possible in summer and 44 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10.3 miles per hour, in March.

Physiography, Relief, and Drainage

The county is drained by several small streams that outlet into the Ohio River on the south, west, and east boundaries of Perry County. The Anderson River, which forms most of the western boundary, drains the largest area, nearly 107,000 acres. Other major watersheds are the Middle Fork of the Anderson River, Deer Creek, Middle Deer Creek, Oil Creek, Stinking Creek, and Poison Creek. The northeastern part of the county drains northward and eastward into Crawford County and into the Blue River. The Middle Fork Conservancy District was formed to oversee the construction of several watershed structures to control flooding within the Middle Fork Watershed.

Tipsaw, Celina, Indian, and Saddle Lakes and the surrounding properties are used for fishing, swimming, camping, hiking, hunting, and other recreational activities. The United States Department of Agriculture, Forest Service, manages these areas. Other structures are for flood control and only impound a small pool of water. The topography of the county is varied with steep, highly dissected, and rolling uplands, nearly level to steep stream terraces, and nearly level bottom lands. The highest point in the county is in the southeastern corner of the county at about 875 feet above sea level. The lowest point is where the Ohio River leaves the county just west of Troy at about 380 feet above sea level.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and

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

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

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

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

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

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

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.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils of earlier surveys nor with those of the surveys of adjacent survey areas. These differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the extent of soils in the survey areas.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

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

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

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit.

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, 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, Stendal silt loam, 0 to 2 percent slopes, frequently flooded, brief duration, is a phase of the Stendal series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Ebal-Deuchars-Kitterman complex, 12 to 24 percent slopes, eroded, is an example.

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

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines

many of the terms used in describing the soils or miscellaneous areas.

AbvD2—Adyeville-Wellston-Deuchars silt loams, 8 to 20 percent slopes, eroded

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Backslopes

Composition (fig. 2)

Adyeville and similar soils: 29 percent
Wellston and similar soils: 25 percent
Deuchars and similar soils: 18 percent
Dissimilar components: 28 percent
- Apalona soils that have slopes of 6 to 15 percent; on shoulders and backslopes
- Adyeville-Tipsaw-Ebal soils that have slopes of 20 to 50 percent; on backslopes
- Adyeville-Wellston-Deuchars stony silt loams intermixed throughout the unit
- Ebal soils that have slopes of 8 to 20 percent; on shoulders and backslopes and intermixed throughout the unit
- Gatchel soils on flood plains and alluvial fans
- Rock outcrop intermixed throughout the unit

Properties and Qualities of the Adyeville Soil

Parent material: Residuum derived from interbedded sandstone, shale, and siltstone
Slope: 8 to 20 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Available water capacity to a depth of 60 inches: About 4.1 inches

Properties and Qualities of the Wellston Soil

Parent material: Loess over residuum derived from interbedded sandstone, siltstone, and shale
Slope: 8 to 20 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 8.3 inches

Properties and Qualities of the Deuchars Soil

Parent material: Loess or silty colluvium over residuum derived from shale interbedded with thin beds of sandstone
Slope: 8 to 20 percent
Depth to restrictive feature: 60 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 8.9 inches

AbvD3—Adyeville-Wellston-Deuchars silt loams, 8 to 20 percent slopes, severely eroded

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Backslopes

Composition

Adyeville and similar soils: 29 percent
Wellston and similar soils: 25 percent
Deuchars and similar soils: 18 percent
Dissimilar components: 28 percent
- Adyeville-Tipsaw-Ebal soils that have slopes of 20 to 50 percent; on backslopes
- Adyeville-Wellston-Deuchars stony silt loams intermixed throughout the unit
- Ebal soils that have slopes of 8 to 20 percent; on shoulders and backslopes and intermixed throughout the unit
- Gatchel soils on flood plains and alluvial fans
- Rock outcrop intermixed throughout the unit

Properties and Qualities of the Adyeville Soil

Parent material: Residuum derived from interbedded sandstone, shale, and siltstone
Slope: 8 to 20 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Available water capacity to a depth of 60 inches: About 3.8 inches

Properties and Qualities of the Wellston Soil

Parent material: Loess over residuum derived from interbedded sandstone, siltstone, and shale
Slope: 8 to 20 percent
Depth to restrictive feature: 40 to 60 inches to bedrock (paralithic)
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 7.8 inches

Figure 2.—An area of Adyeville-Wellston-Deuchars silt loams, 8 to 20 percent slopes, eroded, is being used to grow pine trees to be marketed at Christmas. These soils are fairly well suited to tree production.

Properties and Qualities of the Deuchars Soil

Parent material: Loess or silty colluvium over residuum derived from shale interbedded with thin beds of sandstone
Slope: 8 to 20 percent
Depth to restrictive feature: 60 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 8.3 inches

AccG—Adyeville-Tipsaw-Ebal complex, 20 to 50 percent slopes, very rocky

Setting

Landform: Hills and scarps underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Backslopes

Composition

Adyeville and similar soils: 31 percent
Tipsaw and similar soils: 24 percent
Ebal and similar soils: 17 percent
Dissimilar components: 28 percent

- Adyeville, Wellston, and Deuchars soils that have slopes of 6 to 20 percent; on shoulders and backslopes
- Jubin and Branchville soils on footslopes below rock outcrop
- Rock outcrop intermixed throughout the unit
- Gatchel soils on flood plains and alluvial fans

Properties and Qualities of the Adyeville Soil

Parent material: Residuum derived from interbedded sandstone, shale, and siltstone
Slope: 20 to 50 percent

Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Available water capacity to a depth of 60 inches: About 4.1 inches

Properties and Qualities of the Tipsaw Soil

Parent material: Residuum derived from interbedded sandstone, shale, and siltstone
Slope: 20 to 50 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Somewhat excessively drained
Available water capacity to a depth of 60 inches: About 3.3 inches

Properties and Qualities of the Ebal Soil

Parent material: 10 to 30 inches of loamy colluvium over clayey residuum from shale
Slope: 20 to 30 percent
Depth to restrictive feature: 50 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.1 inches

AcuF—Alford silt loam, 18 to 35 percent slopes

Setting

Landform: Loess hills
Position on the landform: Backslopes

Composition

Alford and similar soils: 85 percent
Dissimilar components: 15 percent
- Alford soils that have slopes of 35 to 50 percent; on backslopes
- Alford soils that have slopes of 6 to 18 percent; on summits and shoulders

Properties and Qualities of the Alford Soil

Parent material: Loess
Slope: 18 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.8 inches

AfzG—Alvin-Tobinsport complex, 25 to 45 percent slopes

Setting

Landform: Dunes
Position on the landform: Backslopes

Composition

Alvin and similar soils: 44 percent
Tobinsport and similar soils: 36 percent
Dissimilar components: 20 percent
- Bloomfield soils intermixed throughout the unit
- Alvin and Tobinsport that have slopes of 6 to 25 percent; on summits and shoulders

Properties and Qualities of the Alvin Soil

Parent material: Loamy and sandy eolian deposits
Slope: 25 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 8.9 inches

Properties and Qualities of the Tobinsport Soil

Parent material: 20 to 40 inches of loess over loamy and sandy eolian deposits
Slope: 25 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.0 inches

AgrA—Apalona silt loam, 0 to 2 percent slopes

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Summits

Composition

Apalona and similar soils: 95 percent
Dissimilar components: 5 percent
- Johnsburg soils in slight depressions

Properties and Qualities of the Apalona Soil

Parent material: Loess over clayey and loamy residuum derived from interbedded sandstone, shale, and siltstone

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to a fragipan; 72 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.7 inches

AgrB—Apalona silt loam, 2 to 6 percent slopes

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Summits and shoulders

Composition (fig. 3)

Apalona and similar soils: 90 percent

Dissimilar components: 10 percent
- Apalona soils that have slopes of 6 to 12 percent; on backslopes
- Deuchars soils that have slopes of 2 to 6 percent; on shoulders and backslopes
- Johnsburg soils that have slopes of 2 to 6 percent; above headslopes

Properties and Qualities of the Apalona Soil

Parent material: Loess over clayey and loamy residuum derived from interbedded sandstone, shale, and siltstone
Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 40 inches to a fragipan; 72 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.1 inches

Figure 3.—An area of Apalona silt loam, 2 to 6 percent slopes, is being used to produce corn. The no-till conservation practice minimizes the erosion hazard on this soil.

AgrC2—Apalona silt loam, 6 to 12 percent slopes, eroded

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Shoulders and backslopes

Composition

Apalona and similar soils: 73 percent
Dissimilar components: 27 percent
- Apalona soils that have slopes of 6 to 12 percent and are severely eroded; on backslopes and shoulders
- Deuchars and Wellston soils that have slopes of 6 to 15 percent; on shoulders and backslopes
- Wakeland soils on toeslopes
- Apalona soils that have slopes of 2 to 6 percent; on summits

Properties and Qualities of the Apalona Soil

Parent material: Loess over clayey and loamy residuum derived from interbedded sandstone, shale, and siltstone
Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to a fragipan; 72 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.1 inches

AgrC3—Apalona silt loam, 6 to 12 percent slopes, severely eroded

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Shoulders and backslopes

Composition

Apalona and similar soils: 73 percent
Dissimilar components: 27 percent
- Apalona soils that have slopes of 6 to 12 percent and are eroded; on backslopes and shoulders
- Deuchars and Wellston soils that have slopes of 6 to 15 percent; on shoulders and backslopes
- Wakeland soils on toeslopes
- Apalona soils that have slopes of 2 to 6 percent; on summits

Properties and Qualities of the Apalona Soil

Parent material: Loess over clayey and loamy residuum derived from interbedded sandstone, shale, and siltstone
Slope: 6 to 12 percent
Depth to restrictive feature: 15 to 24 inches to a fragipan; 72 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 6.4 inches

BkeC2—Bloomfield-Alvin complex, 6 to 15 percent slopes, eroded

Setting

Landform: Dunes
Position on the landform: Shoulders and backslopes

Composition

Bloomfield and similar soils: 48 percent
Alvin and similar soils: 40 percent
Dissimilar components: 12 percent
- Bloomfield and Alvin soils that have slopes of 2 to 6 percent; on summits
- Bloomfield and Alvin soils that have slopes of 15 to 25 percent; on backslopes
- Alford soils that have slopes of 6 to 18 percent; on shoulders and backslopes

Properties and Qualities of the Bloomfield Soil

Parent material: Eolian sands
Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Available water capacity to a depth of 60 inches: About 5.9 inches

Properties and Qualities of the Alvin Soil

Parent material: Loamy and sandy eolian deposits
Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.8 inches

BodAH—Bonnie silt loam, 0 to 1 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Backswamps

Composition

Bonnie and similar soils: 90 percent
Dissimilar components: 10 percent
- Stendal soils on the slightly higher flood-plain steps

Properties and Qualities of the Bonnie Soil

Parent material: Acid, silty alluvium
Slope: 0 to 1 percent
Ponding: 0.5 foot
Depth to restrictive feature: More than 60 inches
Drainage class: Poorly drained
Available water capacity to a depth of 60 inches: About 11.2 inches

BodAM—Bonnie silt loam, ponded, 0 to 1 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Backswamps

Composition

Bonnie and similar soils: 100 percent

Properties and Qualities of the Bonnie Soil

Parent material: Acid, silty alluvium
Slope: 0 to 1 percent
Ponding: 2 feet
Depth to restrictive feature: More than 60 inches
Drainage class: Very poorly drained
Available water capacity to a depth of 60 inches: About 12.4 inches

CndAH—Combs loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Natural levees

Composition

Combs and similar soils: 95 percent
Dissimilar components: 5 percent
- Huntington soils on natural levees

Properties and Qualities of the Combs Soil

Parent material: Loamy alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.6 inches

CwaAH—Cuba silt loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Cuba and similar soils: 87 percent
Dissimilar components: 13 percent
- Cuba soils that have slopes of 4 to 12 percent; on risers of flood-plain steps
- Steff soils intermixed throughout the unit
- Wakeland and Wilbur soils in drainageways

Properties and Qualities of the Cuba Soil

Parent material: Acid, silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.7 inches

DduC2—Deuchars silt loam, 6 to 12 percent slopes, eroded

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Shoulders and backslopes

Composition

Deuchars and similar soils: 90 percent
Dissimilar components: 10 percent
- Apalona and Ebal soils that have slopes of 6 to 12 percent; intermixed throughout the unit

Properties and Qualities of the Deuchars Soil

Parent material: Loess or silty colluvium over residuum derived from shale interbedded with thin beds of sandstone
Slope: 6 to 12 percent
Depth to restrictive feature: 60 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained

Available water capacity to a depth of 60 inches: About 8.9 inches

EabD2—Ebal-Deuchars-Kitterman complex, 12 to 24 percent slopes, eroded

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Shoulders and backslopes

Composition

Ebal and similar soils: 34 percent
Deuchars and similar soils: 22 percent
Kitterman and similar soils: 19 percent
Dissimilar components: 25 percent
• Ebal, Deuchars, and Kitterman soils that have a stony or bouldery surface layer
• A very deep, well drained, loamy colluvial soil that has slopes of 12 to 24 percent; on the upper part of backslopes and intermixed throughout the unit
• Apalona soils that have slopes of 2 to 12 percent; on summits and shoulders and intermixed throughout the unit
• Ebal, Adyeville, and Tipsaw soils that have slopes of 24 to 50 percent; on backslopes
• Gatchel soils on toeslopes

Properties and Qualities of the Ebal Soil

Parent material: 10 to 30 inches of loamy colluvium over clayey residuum from shale
Slope: 12 to 24 percent
Depth to restrictive feature: 50 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.4 inches

Properties and Qualities of the Deuchars Soil

Parent material: Loess or silty colluvium over residuum derived from shale interbedded with thin beds of sandstone
Slope: 12 to 24 percent
Depth to restrictive feature: 60 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 8.9 inches

Properties and Qualities of the Kitterman Soil

Parent material: 0 to 10 inches of loess over residuum derived from shale
Slope: 12 to 24 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 3.8 inches

EabD3—Ebal-Deuchars-Kitterman complex, 12 to 24 percent slopes, severely eroded

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Shoulders and backslopes

Composition

Ebal and similar soils: 34 percent
Deuchars and similar soils: 22 percent
Kitterman and similar soils: 19 percent
Dissimilar components: 25 percent
• Ebal, Deuchars, and Kitterman soils that have a stony or bouldery surface layer
• A very deep, well drained, loamy colluvial soil that has slopes of 12 to 24 percent; on the upper part of backslopes and intermixed throughout the unit
• Apalona soils that have slopes of 2 to 12 percent; on summits and shoulders and intermixed throughout the unit
• Ebal, Adyeville, and Tipsaw soils that have slopes of 24 to 50 percent; on backslopes
• Gatchel soils on toeslopes

Properties and Qualities of the Ebal Soil

Parent material: 10 to 30 inches of loamy colluvium over clayey residuum from shale
Slope: 12 to 24 percent
Depth to restrictive feature: 50 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.0 inches

Properties and Qualities of the Deuchars Soil

Parent material: Loess or silty colluvium over residuum derived from shale interbedded with thin beds of sandstone
Slope: 12 to 24 percent
Depth to restrictive feature: 60 to more than 80 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 8.3 inches

Properties and Qualities of the Kitterman Soil

Parent material: 0 to 10 inches of loess over residuum derived from shale
Slope: 12 to 24 percent
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 3.2 inches

EemAQ—Elk silt loam, moderately wet substratum, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Elk and similar soils: 90 percent
Dissimilar components: 10 percent
- A very deep, moderately well drained, silty soil in drainageways
- Cuba soils on the lower lying flood-plain steps

Properties and Qualities of the Elk Soil

Parent material: Silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 11.1 inches

EesA—Elkinsville-Millstone complex, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Elkinsville and similar soils: 52 percent
Millstone and similar soils: 43 percent
Dissimilar components: 5 percent
- Sciotoville soils intermixed throughout the unit

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.7 inches

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.4 inches

EesAQ—Elkinsville-Millstone complex, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Elkinsville and similar soils: 44 percent
Millstone and similar soils: 36 percent
Dissimilar components: 20 percent
- Elkinsville and Millstone soils, occasionally flooded on the lower lying flood-plain steps
- Sciotoville soils intermixed throughout the unit

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.7 inches

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.4 inches

EesD2—Elkinsville-Millstone complex, 12 to 18 percent slopes, eroded

Setting

Landform: Stream terraces
Position on the landform: Risers

Composition

Elkinsville and similar soils: 60 percent
Millstone and similar soils: 40 percent

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.4 inches

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.2 inches

EesDQ—Elkinsville-Millstone complex, 12 to 18 percent slopes, eroded, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Risers

Composition

Elkinsville and similar soils: 60 percent
Millstone and similar soils: 40 percent

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.4 inches

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.2 inches

EesFQ—Elkinsville-Millstone complex, 18 to 40 percent slopes, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Risers

Composition

Elkinsville and similar soils: 50 percent
Millstone and similar soils: 30 percent
Dissimilar components: 20 percent
• Elkinsville and Millstone soils, occasionally flooded, on the lower part of backslopes

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 18 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.3 inches

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 18 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.1 inches

GacAW—Gatchel loam, 0 to 2 percent slopes, occasionally flooded, very brief duration

Setting

Landform: Flood plains
Position on the landform: Natural levees and alluvial fans

Composition

Gatchel and similar soils: 88 percent
Dissimilar components: 12 percent
• Haymond and Wirt soils on the slightly lower lying flood-plain steps and intermixed throughout the unit
• Gatchel soils, frequently flooded, above water impoundment structures

Properties and Qualities of the Gatchel Soil

Parent material: Loamy alluvium over alluvium with rock fragments
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Somewhat excessively drained
Available water capacity to a depth of 60 inches: About 6.1 inches

GhaA—Ginat silt loam, 0 to 1 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Ginat and similar soils: 80 percent
Dissimilar components: 20 percent
- Ginat soils, ponded, in closed depressions
- Hatfield soils on slight rises
- A very deep, poorly drained, fine-textured soil intermixed throughout the unit

Properties and Qualities of the Ginat Soil

Parent material: Silty alluvium over loamy and clayey alluvium
Slope: 0 to 1 percent
Ponding: 0.5 foot
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity to a depth of 60 inches: About 10.5 inches

HbhA—Hartz silt loam, 0 to 2 percent slopes

Setting

Landform: Lake plains
Position on the landform: Flats

Composition

Hartz and similar soils: 90 percent
Dissimilar components: 10 percent
- Lauer soils in slight depressions
- Percell soils on slight rises and shoulders

Properties and Qualities of the Hartz Soil

Parent material: 45 to 70 inches of loess over silty and clayey lacustrine deposits
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 10.9 inches

HcaA—Hatfield silt loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Hatfield and similar soils: 90 percent
Dissimilar components: 10 percent
- Sciotoville soils on slight rises
- Ginat soils in slight depressions

Properties and Qualities of the Hatfield Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 8.8 inches

HcbAQ—Hatfield silty clay loam, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Hatfield and similar soils: 85 percent
Dissimilar components: 15 percent
- Sciotoville soils, rarely flooded, on slight rises
- Hatfield soils, occasionally flooded, on the slightly lower lying flood-plain steps
- Ginat soils, rarely flooded, in slight depressions

Properties and Qualities of the Hatfield Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 8.4 inches

HcgAH—Haymond silt loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Natural levees and flood-plain steps

Composition (fig. 4)

Haymond and similar soils: 85 percent
Dissimilar components: 15 percent

Figure 4.—The soils in this area of Haymond silt loam, 0 to 2 percent slopes, flooded, brief duration, have a very high available water capacity for crop production but are subject to frequent periods of flooding. This young soybean crop is severely damaged from floodwaters and will have to be replanted.

- Wilbur soils in drainageways
- Wirt soils intermixed throughout the unit
- Gatchel soils on flood-plain steps and alluvial fans

Properties and Qualities of the Haymond Soil

Parent material: Silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 12.4 inches

HcgAQ—Haymond silt loam, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Flood plains
Position on the landform: Natural levees and flood-plain steps

Composition

Haymond and similar soils: 85 percent
Dissimilar components: 15 percent
- Wilbur soils in drainageways
- Wirt soils intermixed throughout the unit
- Gatchel soils on flood-plain steps and alluvial fans

Properties and Qualities of the Haymond Soil

Parent material: Silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 12.4 inches

HsaB2—Hosmer silt loam, 2 to 6 percent slopes, eroded

Setting

Landform: Loess hills
Position on the landform: Summits

Composition

Hosmer and similar soils: 95 percent
Dissimilar components: 5 percent
- Rickert soils intermixed throughout the unit

Properties and Qualities of the Hosmer Soil

Parent material: Loess
Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 40 inches to a fragipan
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.7 inches

HubAH—Huntington silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Natural levees and flood-plain steps

Composition

Huntington and similar soils: 87 percent
Dissimilar components: 13 percent
- McAdoo soils intermixed throughout the unit
- A very deep, moderately well drained, silty soil in drainageways

Properties and Qualities of the Huntington Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 12.0 inches

JoaA—Johnsburg silt loam, 0 to 2 percent slopes

Setting

Landform: Hills and structural benches underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Summits

Composition

Johnsburg and similar soils: 92 percent
Dissimilar components: 8 percent
- Apalona soils on slight rises
- A very deep, poorly drained, silty soil in slight depressions

Properties and Qualities of the Johnsburg Soil

Parent material: Loess over residuum derived from interbedded siltstone, sandstone, or shale
Slope: 0 to 2 percent
Depth to restrictive feature: 60 to 100 inches to bedrock (paralithic)
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 8.4 inches

JoeG—Jubin-Branchville-Rock outcrop complex, 20 to 50 percent slopes, very bouldery

Setting

Landform: Hills and scarps underlain with interbedded sandstone, shale, and siltstone
Position on the landform: Backslopes

Composition

Jubin and similar soils: 40 percent
Branchville and similar soils: 32 percent
Rock outcrop and similar soils: 18 percent
Dissimilar components: 10 percent
- Ebal soils on the lower part of footslopes and intermixed throughout the unit
- Tipsaw soils on backslopes above rock outcrops

Properties and Qualities of the Jubin Soil

Parent material: Colluvium derived from sandstone and siltstone
Slope: 20 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 4.3 inches

Properties and Qualities of the Branchville Soil

Parent material: 20 to 40 inches of colluvium derived from sandstone and siltstone over residuum derived from shale
Slope: 20 to 50 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 5.8 inches

Properties and Qualities of Rock Outcrop

Exposures of bare bedrock, consisting mainly of very strongly cemented and indurated sandstone, with lesser amounts of indurated limestone.

LeaA—Lauer silt loam, 0 to 2 percent slopes

Setting

Landform: Lake plains
Position on the landform: Flats

Composition

Lauer and similar soils: 90 percent
Dissimilar components: 10 percent
- Hartz soils on slight rises
- A very deep, poorly drained, silty soil in slight depressions

Properties and Qualities of the Lauer Soil

Parent material: 45 to 70 inches of loess over silty and clayey lacustrine deposits
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 10.8 inches

McgC2—Markland silt loam, 6 to 12 percent slopes, eroded

Setting

Landform: Dissected lake plains
Position on the landform: Shoulders and backslopes

Composition

Markland and similar soils: 74 percent
Dissimilar components: 26 percent
- Markland soils, severely eroded, intermixed throughout the unit
- Percell soils that have slopes of 2 to 12 percent; on summits and shoulders
- Shircliff soils that have slopes of 2 to 12 percent; on summits, shoulders, and the upper part of backslopes
- Markland soils that have slopes of 12 to 18 percent; on backslopes

Properties and Qualities of the Markland Soil

Parent material: 3 to 18 inches of loess over calcareous, fine-textured lacustrine deposits
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.6 inches

McnGQ—Markland silt loam, 18 to 50 percent slopes, rarely flooded

Setting

Landform: Dissected lake plains
Position on the landform: Backslopes

Composition

Markland and similar soils: 75 percent
Dissimilar components: 25 percent
- Markland soils, occasionally flooded, on the lower part of backslopes
- Markland soils, severely eroded, intermixed throughout the unit
- A very deep, well drained, silty soil intermixed throughout the unit

Properties and Qualities of the Markland Soil

Parent material: 3 to 18 inches of loess over calcareous, fine-textured lacustrine deposits
Slope: 18 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.1 inches

McpC3—Markland silty clay loam, 6 to 12 percent slopes, severely eroded

Setting

Landform: Dissected lake plains
Position on the landform: Shoulders and backslopes

Composition

Markland and similar soils: 73 percent
Dissimilar components: 27 percent
- Markland silt loam soils, eroded, intermixed throughout the unit
- Percell soils that have slopes of 6 to 12 percent; intermixed throughout the unit

• Markland soils that have slopes of 12 to 18 percent; on backslopes
• Shircliff soils that have slopes of 2 to 6 percent; on summits

Properties and Qualities of the Markland Soil

Parent material: 3 to 18 inches of loess over calcareous, fine-textured lacustrine deposits
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.4 inches

McuDQ—Markland silty clay loam, 12 to 25 percent slopes, severely eroded, rarely flooded

Setting

Landform: Dissected lake plains
Position on the landform: Backslopes

Composition

Markland and similar soils: 70 percent
Dissimilar components: 30 percent
• Markland silt loam soils that are eroded and intermixed throughout the unit
• Markland soils, occasionally flooded, on the lower part of backslopes
• Markland soils that have slopes of 6 to 12 percent; on shoulders
• Percell soils that have slopes of 12 to 18 percent; on backslopes and intermixed throughout the unit

Properties and Qualities of the Markland Soil

Parent material: 3 to 18 inches of loess over calcareous, fine-textured lacustrine deposits
Slope: 12 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.4 inches

MhkAH—McAdoo silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Natural levees and flood-plain steps

Composition

McAdoo and similar soils: 90 percent
Dissimilar components: 10 percent
• A very deep, moderately well drained, silty soil in drainageways
• Huntington soils intermixed throughout the unit

Properties and Qualities of the McAdoo Soil

Parent material: Silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 11.9 inches

MhuA—McGary silt loam, 0 to 2 percent slopes

Setting

Landform: Lake plains
Position on the landform: Flats

Composition

McGary and similar soils: 85 percent
Dissimilar components: 15 percent
• Shircliff soils on slight rises
• McGary soils that have slopes of 2 to 4 percent; on footslopes
• Zipp soils in depressions

Properties and Qualities of the McGary Soil

Parent material: 6 to 20 inches of loess over calcareous, fine-textured lacustrine deposits
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 9.5 inches

MsbB—Millstone-Elkinsville complex, 2 to 6 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Millstone and similar soils: 57 percent
Elkinsville and similar soils: 38 percent
Dissimilar components: 5 percent
• Sciotoville soils that have slopes of 2 to 6 percent; intermixed throughout the unit

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.3 inches

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.6 inches

MsbBQ—Millstone-Elkinsville complex, 2 to 6 percent slopes, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Millstone and similar soils: 52 percent
Elkinsville and similar soils: 33 percent
Dissimilar components: 15 percent
• Millstone and Elkinsville soils, occasionally flooded, on the slightly lower lying flood-plain steps
• Sciotoville soils that have slopes of 2 to 6 percent and are rarely flooded; intermixed throughout the unit

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.3 inches

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.6 inches

MsbC2—Millstone-Elkinsville complex, 6 to 12 percent slopes, eroded

Setting

Landform: Stream terraces
Position on the landform: Risers

Composition

Millstone and similar soils: 52 percent
Elkinsville and similar soils: 43 percent
Dissimilar components: 5 percent
• Sciotoville soils that have slopes of 6 to 12 percent; intermixed throughout the unit

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.2 inches

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.5 inches

MsbCQ—Millstone-Elkinsville complex, 6 to 12 percent slopes, eroded, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Risers

Composition

Millstone and similar soils: 47 percent
Elkinsville and similar soils: 38 percent
Dissimilar components: 15 percent
• Millstone and Elkinsville soils, occasionally flooded, on the slightly lower lying flood-plain steps
• Sciotoville soils that have slopes of 6 to 12 percent and are rarely flooded; intermixed throughout the unit

Properties and Qualities of the Millstone Soil

Parent material: Loamy alluvium

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.2 inches

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.5 inches

NbgAH—Newark silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Newark and similar soils: 85 percent
Dissimilar components: 15 percent
- A very deep, moderately well drained, silty soil on the slightly higher lying flood-plain steps
- Petrolia soils in backswamps

Properties and Qualities of the Newark Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 10.9 inches

PhwA—Percell silt loam, 0 to 2 percent slopes

Setting

Landform: Lake plains
Position on the landform: Flats

Composition

Percell and similar soils: 90 percent
Dissimilar components: 10 percent
- Hartz soils on flats

Properties and Qualities of the Percell Soil

Parent material: 45 to 70 inches of loess over silty and clayey lacustrine deposits
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 10.8 inches

PhwB2—Percell silt loam, 2 to 6 percent slopes, eroded

Setting

Landform: Dissected lake plains
Position on the landform: Summits and shoulders

Composition

Percell and similar soils: 92 percent
Dissimilar components: 8 percent
- Hartz soils that have slopes of 2 to 6 percent; on head slopes
- Percell soils that have slopes of 6 to 12 percent; on backslopes

Properties and Qualities of the Percell Soil

Parent material: 5 to 70 inches of loess over silty and clayey lacustrine deposits
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 10.7 inches

PkaAH—Petrolia silty clay loam, 0 to 1 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Backswamps

Composition

Petrolia and similar soils: 75 percent
Dissimilar components: 25 percent
- Petrolia soils, ponded, in backswamps and intermixed throughout the unit
- Newark soils on the slightly higher lying flood-plain steps

Properties and Qualities of the Petrolia Soil

Parent material: Silty alluvium
Slope: 0 to 1 percent
Ponding: 1 foot
Depth to restrictive feature: More than 60 inches
Drainage class: Poorly drained

Available water capacity to a depth of 60 inches: About 10.6 inches

PsmA—Princeton loam, 0 to 2 percent slopes

Setting

Landform: Stream terrace
Position on the landform: Treads

Composition

Princeton and similar soils: 90 percent
Dissimilar components: 10 percent
- Alvin and Bloomfield soils on dunes

Properties and Qualities of the Princeton Soil

Parent material: Loamy and sandy eolian deposits
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.9 inches

RatAH—Rahm silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Rahm and similar soils: 90 percent
Dissimilar components: 10 percent
- Woodmere soils on the slightly higher lying flood-plain steps
- A very deep, poorly drained, silty soil in depressions

Properties and Qualities of the Rahm Soil

Parent material: 20 to 36 inches of recent alluvium over older alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 10.1 inches

RgvB—Rickert-Alford silt loams, 2 to 6 percent slopes

Setting

Landform: Loess hills
Position on the landform: Summits

Composition

Rickert and similar soils: 57 percent
Alford and similar soils: 38 percent
Dissimilar components: 5 percent
- Rickert and Alford soils that have slopes of 6 to 12 percent; on shoulders
- Apalona soils that have slopes of 2 to 12 percent; intermixed throughout the unit

Properties and Qualities of the Rickert Soil

Parent material: Loess
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.6 inches

Properties and Qualities of the Alford Soil

Parent material: Loess
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.9 inches

RgvC2—Rickert-Alford silt loams, 6 to 12 percent slopes, eroded

Setting

Landform: Loess hills
Position on the landform: Shoulders and backslopes

Composition

Rickert and similar soils: 55 percent
Alford and similar soils: 35 percent
Dissimilar components: 10 percent
- Rickert and Alford soils that have slopes of 12 to 18 percent; on backslopes
- Apalona soils that have slopes of 6 to 12 percent; intermixed throughout the unit
- Wellston soils that have slopes of 6 to 18 percent; intermixed throughout the unit

Properties and Qualities of the Rickert Soil

Parent material: Loess
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.4 inches

Properties and Qualities of the Alford Soil

Parent material: Loess
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.8 inches

RgvC3—Rickert-Alford silt loams, 6 to 12 percent slopes, severely eroded

Setting

Landform: Loess hills
Position on the landform: Shoulders and backslopes

Composition

Rickert and similar soils: 55 percent
Alford and similar soils: 35 percent
Dissimilar components: 10 percent
• Rickert and Alford soils that have slopes of 12 to 18 percent; on backslopes
• Apalona soils that have slopes of 6 to 12 percent; intermixed throughout the unit
• Wellston soils that have slopes of 6 to 18 percent; intermixed throughout the unit

Properties and Qualities of the Rickert Soil

Parent material: Loess
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.0 inches

Properties and Qualities of the Alford Soil

Parent material: Loess
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.7 inches

RgvD3—Rickert-Alford silt loams, 12 to 18 percent slopes, severely eroded

Setting

Landform: Loess hills
Position on the landform: Backslopes

Composition

Rickert and similar soils: 64 percent
Alford and similar soils: 21 percent
Dissimilar components: 15 percent
• Rickert and Alford soils that have slopes of 6 to 12 percent; on shoulders
• Adyeville and Wellston soils on backslopes and intermixed throughout the unit

Properties and Qualities of the Rickert Soil

Parent material: Loess
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.9 inches

Properties and Qualities of the Alford Soil

Parent material: Loess
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.7 inches

RtcB2—Ryker silt loam, 2 to 6 percent slopes, eroded

Setting

Landform: Hills underlain with limestone
Position on the landform: Summits

Composition

Ryker and similar soils: 100 percent

Properties and Qualities of the Ryker Soil

Parent material: 20 to 40 inches of loess over residuum derived from limestone
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.2 inches

RtcC2—Ryker silt loam, 6 to 12 percent slopes, eroded

Setting

Landform: Hills underlain with limestone
Position on the landform: Shoulders and backslopes

Composition

Ryker and similar soils: 90 percent
Dissimilar components: 10 percent
• A deep and very deep, well drained, clayey soil intermixed throughout the unit

Properties and Qualities of the Ryker Soil

Parent material: 20 to 40 inches of loess over residuum derived from limestone
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.9 inches

ScbA—Sciotoville silt loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Sciotoville and similar soils: 88 percent
Dissimilar components: 12 percent
• Elkinsville and Millstone soils that have slopes of 0 to 2 percent; intermixed throughout the unit
• Hatfield soils in slight depressions

Properties and Qualities of the Sciotoville Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.7 inches

ScbAQ—Sciotoville silt loam, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Sciotoville and similar soils: 76 percent
Dissimilar components: 24 percent
• Sciotoville soils, occasionally flooded, on the slightly lower lying flood-plain steps
• Elkinsville and Millstone soils that have slopes of 0 to 2 percent and are rarely flooded; intermixed throughout the unit
• Hatfield soils, rarely flooded, in slight depressions

Properties and Qualities of the Sciotoville Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.7 inches

ScdB—Sciotoville silt loam, 2 to 4 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Sciotoville and similar soils: 90 percent
Dissimilar components: 10 percent
• Millstone and Elkinsville soils that have slopes of 2 to 4 percent; on slight rises
• Sciotoville soils that have slopes of 4 to 8 percent; on shoulders and backslopes

Properties and Qualities of the Sciotoville Soil

Parent material: Alluvium
Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.7 inches

ScdBQ—Sciotoville silt loam, 2 to 4 percent slopes, rarely flooded

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Sciotoville and similar soils: 78 percent

Dissimilar components: 22 percent
- Sciotoville soils, occasionally flooded, on the slightly lower lying flood-plain steps
- Millstone and Elkinsville soils that have slopes of 2 to 4 percent and are rarely flooded; on slight rises

Properties and Qualities of the Sciotoville Soil

Parent material: Alluvium
Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 7.7 inches

SfyB2—Shircliff silt loam, 2 to 6 percent slopes, eroded

Setting

Landform: Dissected lake plains
Position on the landform: Summits and shoulders

Composition

Shircliff and similar soils: 90 percent
Dissimilar components: 10 percent
- McGary soils that have slopes of 1 to 4 percent; on summits
- Shircliff soils that have slopes of 6 to 12 percent; on shoulders and the upper part of backslopes

Properties and Qualities of the Shircliff Soil

Parent material: 6 to 20 inches of loess over calcareous, fine-textured lacustrine deposits
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 10.1 inches

StdAH—Stendal silt loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Stendal and similar soils: 85 percent
Dissimilar components: 15 percent
- Bonnie soils in backswamps
- A very deep, moderately well drained, silty soil on the slightly higher lying flood-plain steps

Properties and Qualities of the Stendal Soil

Parent material: Acid, silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 12.6 inches

TakC—Tapawingo silt loam, 2 to 12 percent slopes

Setting

Landform: Hills underlain with mine spoil
Position on the landform: Summits, shoulders, and backslopes

Composition (fig. 5)

Tapawingo and similar soils: 95 percent
Dissimilar components: 5 percent
- A very deep, well drained, loamy soil on escarpments
- Tapawingo soils that have a stony silt loam surface layer; intermixed throughout the unit

Properties and Qualities of the Tapawingo Soil

Parent material: 20 to 40 inches of loamy materials over mine spoil
Slope: 2 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 5.2 inches

TakD—Tapawingo silt loam, 12 to 20 percent slopes

Setting

Landform: Hills underlain with mine spoil
Position on the landform: Backslopes

Composition

Tapawingo and similar soils: 95 percent
Dissimilar components: 5 percent
- A very deep, well drained, loamy soil on escarpments
- Tapawingo soils that have a stony silt loam surface layer; intermixed throughout the unit

Properties and Qualities of the Tapawingo Soil

Parent material: 20 to 40 inches of loamy materials over mine spoil
Slope: 12 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 5.2 inches

TckA—Tobinsport silt loam, 0 to 2 percent slopes

Setting

Landform: Interdunes
Position on the landform: Flats

Composition

Tobinsport and similar soils: 95 percent
Dissimilar components: 5 percent
- Princeton soils intermixed throughout the unit

Properties and Qualities of the Tobinsport Soil

Parent material: 20 to 40 inches of loess over loamy and sandy eolian deposits
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.0 inches

Figure 5.—An area of Tapawingo silt loam, 2 to 12 percent slopes, has been seeded to grass. This area was strip mined for coal, and the area was smoothed to its approximate original contour. Compaction of the surface layer is a management concern for growing crops.

TckB—Tobinsport silt loam, 2 to 4 percent slopes

Setting

Landform: Dunes
Position on the landform: Summits and shoulders

Composition

Tobinsport and similar soils: 95 percent
Dissimilar components: 5 percent
- Princeton soils intermixed throughout the unit

Properties and Qualities of the Tobinsport Soil

Parent material: 20 to 40 inches of loess over loamy and sandy eolian deposits
Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.0 inches

Uaa—Udorthents, cut and filled

General Description

Because of the extreme variability of these soils, no typical soil series is representative of these soils. Generally, they consist of areas with mixed, loamy soil materials or a combination of mixed soil materials and refuse materials that have been created by human activity. Included are earthen dams, spillways, fill for highway interchanges, sanitary landfills, and other areas where various thicknesses of soil material have been removed and areas where various thicknesses of soil material have been placed.

Composition

Udorthents and similar soils: 90 percent
Dissimilar components: 10 percent
- Urban land and water in ponds intermixed throughout the unit

UabBK—Udipsamments sandy loam, 1 to 6 percent slopes, occasionally flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Natural levees

Composition

Udipsamments and similar soils: 90 percent
Dissimilar components: 10 percent
- Combs soils on the lower lying flood-plain steps
- Udipsamments that have slopes of 5 to 35 percent; on risers

Properties and Qualities of the Udipsamments Soil

Parent material: Sandy alluvium
Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Available water capacity to a depth of 60 inches: About 3.9 inches

Uas—Udorthents-Pits, quarries complex

General Description

Because of the extreme variability of these soils, no typical soil series is representative of these Udorthents soils. Generally, they consist of areas with mixed, clayey and loamy soil materials or a combination of mixed soil materials. Pits, quarries consist of areas where the surface soil has been removed and limestone bedrock has been extracted for construction material. Most of the area is the actual pit, and some of the area is piles of broken rock, or mixed rock and soil material.

Composition

Udorthents and similar soils: 60 percent
Pits, quarries: 30 percent
Dissimilar components: 10 percent

UddD—Urban land-Alford complex, 6 to 18 percent slopes

Setting

Landform: Loess hills
Position on the landform: Shoulders and backslopes

Composition

Urban land and similar soils: 43 percent
Alford and similar soils: 29 percent
Dissimilar components: 28 percent
- A very deep, loamy udorthents soil intermixed throughout the unit

- Alford soils that have slopes of 0 to 6 percent; on summits
- Rickert soils intermixed throughout the unit

Properties and Qualities of Urban Land

Urban land includes land areas that are covered by paved or graveled roads, parking lots, and walkways, residential and commercial buildings, and cemetery structures.

Properties and Qualities of the Alford Soil

Parent material: Loess
Slope: 6 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.8 inches

UehB—Urban land-Elkinsville-Hatfield complex, 0 to 6 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads

Composition

Urban land: 45 percent
Elkinsville and similar soils: 20 percent
Hatfield and similar soils: 15 percent
Dissimilar components: 20 percent
- A very deep, loamy udorthents soil intermixed throughout the unit
- Millstone and Sciotoville soils intermixed throughout the unit
- Ginat soils in depressions

Properties and Qualities of Urban Land

Urban land includes land areas that are covered by paved or graveled roads, parking lots, and walkways, residential and commercial buildings, and cemetery structures.

Properties and Qualities of the Elkinsville Soil

Parent material: 20 to 40 inches of loess over alluvium; or alluvium
Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 10.6 inches

Properties and Qualities of the Hatfield Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity to a depth of 60 inches: About 8.8 inches

UffY—Urban land, leveed

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Urban land: 70 percent
Dissimilar components: 30 percent
- A very deep, loamy udorthents soil intermixed throughout the unit
- McAdoo and Woodmere soils intermixed throughout the unit

Properties and Qualities of Urban Land

Urban land includes land areas that are covered by paved or graveled roads, parking lots, and walkways, residential and commercial buildings, and cemetery structures.

WaaAH—Wakeland silt loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Wakeland and similar soils: 84 percent
Dissimilar components: 16 percent
- A very deep, poorly drained, silty soil in backswamps
- Wilbur soils on the slightly higher lying flood-plain steps
- Wakeland soils, rarely flooded, on flood plains below watershed structures

Properties and Qualities of the Wakeland Soil

Parent material: Silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Somewhat poorly drained

Available water capacity to a depth of 60 inches: About 12.7 inches

WokAH—Wilbur silt loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Wilbur and similar soils: 86 percent
Dissimilar components: 14 percent
• Haymond and Wakeland soils on the slightly lower lying flood-plain steps

Properties and Qualities of the Wilbur Soil

Parent material: Silty alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 12.4 inches

WprAH—Wirt loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Natural levees and flood-plain steps

Composition

Wirt and similar soils: 87 percent
Dissimilar components: 13 percent
• Haymond soils intermixed throughout the unit
• Gatchel soils on alluvial fans and the lower lying flood-plain steps

Properties and Qualities of the Wirt Soil

Parent material: Alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 60 inches
Drainage class: Well drained
Available water capacity to a depth of 60 inches: About 9.3 inches

WrlAH—Woodmere silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration

Setting

Landform: Flood plains
Position on the landform: Flood-plain steps

Composition

Woodmere and similar soils: 87 percent
Dissimilar components: 13 percent
• Rahm soils in drainageways
• McAdoo soils on flood-plain steps and intermixed throughout the unit

Properties and Qualities of the Woodmere Soil

Parent material: 20 to 36 inches of recent alluvium over older alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity to a depth of 60 inches: About 10.4 inches

ZcaA—Zipp silty clay, 0 to 1 percent slopes

Setting

Landform: Lake plains
Position on the landform: Depressions and flats

Composition

Zipp and similar soils: 95 percent
Dissimilar components: 5 percent
• McGary soils on slight rises
• A very deep, poorly drained, fine-textured, dark colored soil in depressions

Properties and Qualities of the Zipp Soil

Parent material: Fine textured lacustrine deposits
Slope: 0 to 1 percent
Ponding: 0.5 foot
Depth to restrictive feature: More than 60 inches
Drainage class: Poorly drained
Available water capacity to a depth of 60 inches: About 7.0 inches

Use and Management of the Soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and 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.

Interpretive ratings help engineers, planners, and others understand how soil properties influence important nonagricultural uses, such as building site development and construction materials. The ratings indicate the most restrictive soil features affecting the suitability of the soils for these uses.

Soils are rated in their natural state. No unusual modification of the soil site or material is made other than that which is considered normal practice for the rated use. Even though soils may have limitations, it is important to remember that engineers and others can modify soil features or can design or adjust the plans for a structure to compensate for most of the limitations. Most of these practices, however, are costly. The final decision in selecting a site for a particular use generally involves weighing the costs of site preparation and maintenance.

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, camp grounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

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

Rating Class Terms

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

Agronomy

Victor R. Shelton, conservation agronomist, Natural Resources Conservation Service, helped prepare this section.

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

pasture plants are listed for each soil; and prime farmland is described.

Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1996, about 33,600 acres in Perry County, or about 14 percent of the total acreage, was used for grain crops; mainly corn, soybeans, and winter wheat, according to the Perry County Soil and Water Conservation District. About 12,400 acres was used for hay and pasture, and about 8,915 acres was idle cropland used for conservation purposes.

The potential of the soils for increased production of food crops is limited. A small percentage of the acreage that is currently used as forestland or pasture can be converted to cropland. In addition to the reserve productive capacity represented by this land, food production can also be increased considerably by extending the latest crop production technology to all of the cropland in the county. This soil survey can greatly facilitate the application of such technology.

The paragraphs that follow describe the main concerns in managing the soils in the county for crops, pasture, and hayland. These concerns are water erosion, wetness, tilth, and fertility.

Water erosion is a major hazard on about 62 percent of the cropland and pasture in the county. It is a hazard in areas where the slope is more than about 2 percent. Alford, Apalona, Deuchars, Markland, and Rickert soils are examples of soils with an erosion hazard (fig. 6).

Productivity is reduced as fertilizer, pesticides, herbicides, and organic matter is removed from the surface layer. The natural tilth of some soils such as Apalona, Ebal, and Markand soils, is lost as part of the more clayey subsoil is incorporated into the plow layer. Seedbed preparation becomes more difficult and seed germination is hindered. Addition of animal waste that is high in organic matter, such as turkey manure with a sawdust carrier or straw cattle manure, and applied according to soil tests can improve the tilth and add fertility.

Loss of the surface layer is especially damaging to soils that have a fragipan in the subsoil or have bedrock within a depth of 60 inches. The root zone in these soils consists mainly of the part of the soil profile above the limiting layer. As the surface layer is lost, the thickness of the root zone and the available water capacity are reduced. Apalona and Hosmer soils have a fragipan within 40 inches of the surface.

Erosion results in the sedimentation and pollution of ditches, lakes, and streams. Controlling erosion minimizes sedimentation and pollution and improves water quality for fish and wildlife, for municipal use, livestock use, and for recreational uses.

Conservation practices help to control erosion by reducing the runoff rate, increasing the rate of water infiltration, and providing a protective vegetative or residue cover. A conservation tillage system that leaves protective amounts of crop residue on the surface can hold soil losses to amounts that will not reduce the productive capacity of the soils. Rotations including forage crops of grasses and legumes also reduce erosion rates where pasture and hay are needed. The grasses and legumes also provide nitrogen and improve tilth for the following crop.

Most pasture and hay acreage is found on the sloping areas of livestock farms. Rotational grazing, proper stocking rates, adequate rest periods and leaf area left for regrowth, and restricted use during wet periods help maintain a vigorous plant cover, reduce runoff, control erosion, and improve pasture efficiency.

Cover crops are important in controlling erosion on the more sloping soils. Cover crops are especially important after soybeans, corn for silage, tobacco, and vegetable crops are grown. Tillage methods that leave crop residue on 50 percent or more of the surface can protect most of the sloping soils from excessive erosion during winter and early spring.

A conservation tillage system helps to hold soil losses to acceptable levels on most of the sloping soils. If crops are grown year after year on these soils, soil losses generally are high, unless a conservation tillage system is applied.

No-till cropping systems are effective in minimizing soil loss on the sloping soils used for corn or soybeans. A no-till cropping system such as no-till corn, no-till drilled beans, or no-till drilled wheat works quite well on most soils. These conservation tillage systems can be adapted to many of the soils in the county that are susceptible to erosion. When no-till is used on areas that have a thick vegetative cover or protective amounts of crop residue on the surface, soil moisture evaporates at a slower rate and the weed population is reduced. Alford, Apalona, Deuchars, Elkinsville, Millstone, Markland, Rickert, and Shircliff are examples of sloping soils that are suitable for no-till.

Water- and sediment-control basins are effective in reducing the rate of runoff and gully erosion in drainageways. They also trap sediment and improve downstream water quality. They are most effective on soils that have slopes of about 8 percent or less (fig. 7). Apalona, Elkinsville, Markland, Millstone, and Rickert soils are examples.

Figure 6.—Sheet and rill erosion has occurred on this area of Apalona silt loam, 6 to 12 percent slopes, severely eroded. Conservation practices, such as minimum tillage, cover crops, and no-till, minimize the hazard of erosion.

Grassed waterways are needed to protect the channels that drain a watershed. Subsurface drains are needed in areas where excess wetness or seepage is a problem in the waterways. Subsurface drains increase the life of a waterway (fig. 8).

Grade-stabilization structures are needed in many areas of the county where water in one drainageway falls into a more sloping drainageway. These structures stabilize the drainageways and minimize gully erosion.

Diversions reduce the length of slopes, and thus reduce the runoff rate and the erosion hazard. Diversions are most effective and practical on areas with deep, well drained soils that have uniform slopes of about 10 percent or less.

Information about the type and design of erosion-control practices that are best suited to each kind of soil is available at the local office of the Natural Resources Conservation Service.

Wetness is the major management concern on about 8 percent of the cropland and pasture in the county. On most of the naturally wet, poorly drained or very poorly drained Bonnie, Ginat, Petrolia, and Zipp soils, production of the crops commonly grown in the county is generally not practical unless a drainage system is installed. In undrained areas of the somewhat poorly drained Hatfield, Johnsburg, Lauer, McGary, Newark, Rahm, Stendal, and Wakeland soils, wetness significantly damages crops in most years.

Various land use regulations of Federal, State, and local governments may impose special restrictions on the use of soils. An example is the protection of wetlands. Statements made in this section about wetness are intended to help the land user identify and reduce the effects of management concerns related to wetness. The landowner or user has the responsibility of identifying and complying with existing laws and regulations.

The design of both surface and subsurface drainage systems varies with the kind of soil. A combination of surface and subsurface drains is needed on some soils

that are intensively row cropped. Subsurface drains should be more closely spaced in slowly permeable or very slowly permeable soils than in more permeable soils. Filtering material is generally needed on subsurface drains in soils that have minimum grades and high content of silt. Examples of these soils are Bonnie, Newark, Stendal, and Wakeland soils. Finding adequate outlets for subsurface drainage systems is difficult in some areas of Bonnie, Ginat, Petrolia, and Zipp soils.

Further information about the design of drainage systems for each kind of soil is in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils that have good tilth are granular and porous.

Many of the soils used for row crops in the county have a surface layer of silt loam that has a moderate to low content of organic matter. Where there is little or no crop residue, a hard surface crust forms after periods of intensive rainfall. The hard crust reduces the infiltration rate, increases the runoff rate, and inhibits plant emergence. Regular additions of crop residue, cover crops, manure, and other organic material improve soil structure and help to minimize crusting.

Some or all map unit phases of the Hatfield, Huntington, Rahm, Markland, McAdoo, and Newark soils have a moderately fine textured surface layer. Zipp soils have a fine textured surface layer. Tilth is a problem in all areas of these soils. If tilled when too wet, the surface layer becomes very cloddy when dry and cannot be easily worked. As a result, preparing a good seedbed is very difficult. Fall tillage of these soils generally results in better tilth in the spring. Fall tillage

Figure 7.—An embankment pond has been built in an area of Adyeville-Wellston-Deuchars silt loams, 8 to 20 percent slopes, eroded. These soils are generally well suited to pond reservoir areas and provide water for livestock and wildlife. Steepness of the slope is the main construction concern.

Figure 8.—A grassed waterway has been constructed in a drainageway of a moderately sloping area of Apalona soils. Grassed waterways collect and filter sediment from surface water runoff and minimize erosion in the waterway channel.

of most of the cropland generally should not be done because of high potential for damaging erosion.

Many of the soils in the county have a silty or loamy surface layer that is easily compacted. Tilling or grazing when the soils are wet causes surface compaction, which restricts penetration by tillage equipment and plant roots, limits plant growth, and thus limits yield potential.

Soil fertility is affected mainly by reaction and by the content of plant nutrients and organic matter. Most of the soils in the county on upland hills and stream terraces have low natural fertility. They typically are strongly acid or very strongly acid in nonlimed areas. Soils that have a pH level below about 6.5 require applications of ground limestone to raise the pH level sufficiently for cultivated crops, such as corn and soybeans, for best utilization of plant nutrients, and thus for optimum yields. On soils that have a pH below about 6.4, ground limestone is needed for hay and pasture plants, such as alfalfa and red clover. The supply of available phosphorus and potassium is generally below the level needed for good plant growth in most of the soils in areas where fertilizer has been applied. On all soils, additions of lime and fertilizer should be based on the results of soil tests, the needs of the crop, and the desired level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

The pasture plants commonly grown in the county are mixtures of tall fescue, orchardgrass, timothy, alfalfa, and red clover. Other pasture plants are bluegrass, ladino clover, redtop, alsike clover, annual lespedeza, and sweetclover. Most of the soils in the county are well suited to grasses, such as tall fescue, timothy, bromegrass, and orchardgrass, and to legumes, such as red clover, ladino clover, alfalfa, and annual lespedeza. Legumes grow poorly, however, in

soils that are poorly or very poorly drained, such as Bonnie, Ginat, Petrolia, and Zipp. Alsike clover, however, is a somewhat tolerant legume. The growth of most deep-rooted legumes, such as alfalfa and sweetclover, is significantly restricted in soils that have a fragipan, or fragic soil properties, such as Apalona, Hatfield, Hosmer, Johnsburg, and Sciotoville (fig. 9). The life of these plants is exceedingly diminished.

Warm-season grasses are suitable for growth on moderately deep soils such as Adyeville and Kitterman, and soils with low natural fertility. Examples of species that will tolerate these conditions include big bluestem, little bluestem, switchgrass, and Indiangrass. These warm-season grasses will also grow very well on deep, fertile soils and produce huge amounts of root biomass for erosion control and drought tolerance and produce quality forage and wildlife cover. More information on warm-season grasses can be obtained from local offices of the Natural Resources Conservation Service.

Poorly drained and very poorly drained soils, such as Bonnie, Ginat, Petrolia, and Zipp soils, are well suited to water-tolerant grasses such as reed canarygrass. Well drained soils, such as Alford, Princeton, Rickert, and Tobinsport soils, are well suited to deep-rooted legumes, such as alfalfa. The latest information on recommended grasses and legumes for each soil type can be obtained from local offices of the Cooperative Extension Service and Natural Resources Conservation Service.

The field crops suited to the soils and climate in the survey area include those that are currently grown and some that are not commonly grown. Corn, soybeans, and winter wheat are the principal cultivated crops. Other cultivated crops are oats, barley, and rye. Alfalfa, ladino clover, redtop, timothy, red clover, fescue, and orchardgrass are commonly grown for hay and pasture. A few specialty crops are popcorn and sweetcorn, and some grass for seed. A small acreage is used for tobacco and sorghum. Specialty crops that are intensively grown and cultivated should be located where fields can be rotated to help control soil erosion and disease, and placed where tillage operations can be performed across the slope when feasible. Cover crops are recommended after harvest for winter erosion control.

The latest information about growing cultivated crops, hay and pasture plants, and specialty crops can be obtained from local offices of the Cooperative Extension Service or the Natural Resources Conservation Service.

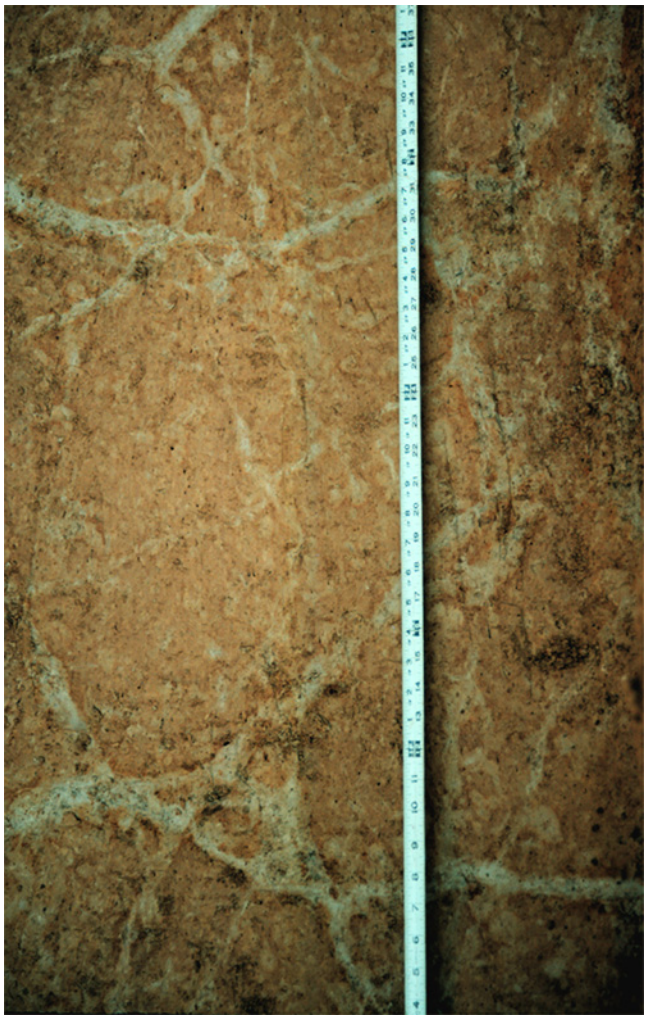

Figure 9.—A horizontal view of a fragipan that is about 3 feet below the soil surface. The gray streaks are separating the prisms, and roots and water can move through the gray streaks. The brown prisms of the fragipan are very firm and dense. Virtually no roots can penetrate this part of the fragipan.

Cropland Limitations and Hazards

The management concerns affecting the use of the soils in the survey area for crops are shown in table 5. The main concerns in managing cropland are controlling water erosion, soil wetness, and ponding; reducing surface crusting; improving poor tilth; and limiting the effects of excessive and restricted permeability and limited available water capacity.

Generally, a combination of several practices is needed to control both *water erosion* and *wind erosion*.

Conservation tillage, stripcropping, contour farming, conservation cropping systems, crop residue management, diversions, and grassed waterways help to minimize soil loss.

Wetness is a limitation in some cropland areas, and *ponding* is a hazard in some areas. Drainage systems consist of subsurface tile drains, surface inlet tile, open drainage ditches, or a combination of these. Measures that maintain the drainage system are needed.

Practices that reduce surface *crusting* and improve poor tilth include incorporating green manure crops, manure, or crop residue into the soil and applying a system of conservation tillage. Surface cloddiness can be minimized by avoiding tillage when the soil is too wet.

Measures that conserve moisture are needed in areas where the soils have a *limited available water capacity*. These measures primarily involve reducing the evaporation and runoff rates and increasing the rate of water intake. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

The natural reaction in the surface layer of most of the soils in the survey area is a *low pH* (soil reaction), except for some soils in flood plains. The pH of many soils needs to be raised to an optimal level for the crop being grown. Soils with a *high pH* may need treatment to lower the pH so that certain elements are adequately available for specific crop use.

Some of the limitations and hazards shown in the table cannot be easily overcome. These are *flooding, low* or *moderate available water capacity,* and *depth to bedrock*.

Soils with bedrock or a fragipan within a depth of 40 inches have *limited rooting depth* and limited available water for plant growth.

Winter grown small grain crops are likely to be damaged after flooding events. Water-tolerant species should be used in areas subject to frequent periods of flooding during the growing season.

Following is an explanation of the criteria used to determine the limitations or hazards.

Crusting.—The content of organic matter in the surface layer is 2 percent or less, the percent passing the number 200 sieve is more than 50 percent, and the content of clay is less than or equal to 32 percent.

Depth to bedrock.—Bedrock is within a depth of 40 inches.

Flooding.—The soil is occasionally or frequently flooded during the growing season.

Low available water capacity.—The weighted average of the available water capacity is equal to or more than 0.05 inch but is less than 0.10 inch of water per inch of soil within a depth of 60 inches.

Ponding.—The soil is subject to ponding during the growing season.

Poor tilth.—The soil typically has 32 percent or more clay in the surface layer.

Low pH.—The typical pH value is equal to or less than 6.0 in the surface layer.

Moderate available water capacity.—The weighted average of the available water capacity is equal to or more than 0.10 inch but is less than 0.15 inch of water per inch of soil within a depth of 60 inches.

Water erosion.—The erodibility factor of the surface layer (Kf or Kw) multiplied by the slope is more than 0.8, and the average slope is 3 percent or more.

Wetness.—The soil has a water table within a depth of 1.5 feet during the growing season.

Wind erosion.—The wind erodibility group is 1 or 2 for soil in flood plains or 3 for soil in other areas.

Erodibility factors (e.g., Kf or Kw) and wind erodibility groups are described under the heading, “Physical Properties.”

Pasture Limitations and Hazards

Growing legumes, cool-season grasses, and warm-season grasses that are suited to the soils and the climate of the area helps to maintain a productive stand of pasture (fig.10).

The management concerns affecting the use of the soils in the survey area for pasture are shown in table 6. The main concerns in managing pasture are water erosion, equipment limitation, wetness and ponding, and low available water capacity. Also, most of the soils suitable for legumes have a high potential for frost action. The local office of the Natural Resources Conservation Service or the Cooperative Extension Service can provide information about legumes that can be damaged by frost heave. This hazard is not listed in table 6 because it applies to majority of the soils.

Both *water erosion* and *wind erosion* reduce the productivity of pastureland. They also result in onsite and offsite sedimentation, cause water pollution by sedimentation, and increase the runoff of livestock manure and other added nutrients. Measures that are effective in controlling water erosion include establishing or renovating stands of legumes and grasses. Controlling erosion during seedbed preparation is a major concern. If the soil is tilled for the reseeding of pasture or hay crops, planting winter cover crops, establishing grassed waterways, farming on the contour, and applying a system of conservation tillage that leaves a protective cover crop residue on the surface can help to minimize erosion.

Overgrazing or grazing when the soil is wet reduces the extent of plant cover and results in surface compaction and poor tilth, and thus it increases the susceptibility to erosion. Proper stocking rates, rotation grazing, and timely deferment of grazing, especially during wet periods, help to keep the pasture in good condition. The proper location of livestock watering facilities helps to prevent surface compaction or the formation of ruts by making it unnecessary for cattle to travel long distances up and down the steep slopes.

In areas where slopes are 15 percent or more, the operation of farm equipment may be restricted and become hazardous. Also soils with rock fragments in the surface layer limit the type of equipment that can be used, or can damage equipment during reseeding and planting operations.

Soils with bedrock or a fragipan within a depth of 40 inches have limited rooting depth and limited available water for plant growth.

Available water capacity refers to the capacity of soils to hold water available for use by most plants. The quality and quantity of pasture plants may be reduced for soils that have low available water capacity. The amount of soil moisture may be inadequate for the maintenance of a healthy community of desired pasture species and, thus the desired number of livestock. A poor-quality pasture increases the hazard of erosion and the runoff of pollutants. Planting drought-resistant species of grasses and legumes helps to establish a protective cover. Irrigation may be used to overcome a low available water capacity.

Wetness is a limitation in some pasture areas, and ponding is a hazard. Drainage systems consist of subsurface tile drains, surface inlet tile, open drainage ditches, or a combination of these. Measures that maintain the drainage system are needed.

Both a *low pH* or a *high pH* (soil reaction) inhibit the uptake of certain nutrients by plants or accelerate the

Figure 10.—Gatchel and Haymond soils (foreground) are well suited for hay and pasture production; however, there is a hazard of flooding.

absorption of certain other elements to the level of toxic concentrations. Either of these conditions affects the health and vigor of plants. For a low pH, applications of lime should be based on the results of soil tests. The goal is to achieve the optimum pH level for the uptake of the major nutrients by the specific grass, legume, or combination of grasses and legumes.

Some of the limitations and hazards shown in the table cannot be easily overcome. These are *depth to bedrock, low* or *moderate available water capacity*, and *flooding*.

Following is an explanation of the criteria used to determine the limitations or hazards.

Water erosion.—The erodibility factor of the surface layer (Kf or Kw) multiplied by the slope is more that 0.8, and the average slope is 3 percent or more.

Depth to bedrock.—Bedrock is within a depth of 40 inches.

Low pH.—The typical pH value is equal to or less than 6.0 in the surface layer.

Equipment limitation.—The soil has a slope of 15 percent or more.

Low available water capacity.—The weighted average of the available water capacity is less than 0.10 inch of water per inch of soil within a depth of 60 inches, or when the weighted average is less than 3 inches in areas where the root zone is less than 60 inches thick.

Moderate available water capacity.—The weighted average of the available water capacity is equal to or more than 0.10 inch, but is less than 0.15 inch of water per inch within a depth of 60 inches.

Flooding.—The soil is occasionally or frequently flooded during the growing season.

Wetness.—The soil is poorly drained or very poorly drained.

Ponding.—The soil is subject to ponding during the growing season.

Wind erosion.—The wind erodibility group is 1 or 2 for soils in flood plains or 3 for soils in other areas.

Erodibility factors (e.g., Kf or Kw) and wind erodibility groups are described under the heading, “Physical Properties.”

Estimated Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 7. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of 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.

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.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

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 relative productivity of a given soil compared with that of other soils, however, is not likely to change.

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

Pasture and Hayland Interpretations

Under good management, proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain sufficient and generally vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing and renovation also are important management practices.

Pasture yield estimates are commonly given in animal unit months (AUM), or 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.

The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about forage yields other than those shown in table 7.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they take into account 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 forestland and for engineering purposes.

In the capability system, soils generally are grouped at three levels—capability class, subclass, and unit (USDA, 1961). These categories indicate the degree and kinds of limitations affecting mechanized farming systems that produce the more commonly grown field crops, such as corn, soybeans, small grain, and hay. Only class and subclass are used in this survey.

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

Class 1 soils have slight limitations that restrict their use.

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

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

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

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

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

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

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

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

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

The capability classification of the map units in this survey area is given in table 7.

Prime Farmland

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

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

for prime farmland is available at the local office of the Natural Resources Conservation Service.

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

About 40,721 acres, or nearly 16 percent of the total acreage, meets the criteria for prime farmland. Areas of this land are throughout the county.

The map units in the survey area that meet the criteria for prime farmland are listed in table 8. This list does not constitute a recommendation for a particular land use. On some soils included in the table, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described in individual sections of this publication.

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.

Windbreaks are often planted on land that did not originally support trees. Knowledge of how trees perform on such land can be gained only by observing and recording the performance of trees that have been planted and have survived. Many popular windbreak species are not indigenous to the areas in which they are planted.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters, a tree or shrub may grow well or grow poorly, depending on the characteristics of the soil. Each tree or shrub has definable potential heights in a given physiographic area and under a given climate. Accurate definitions of potential heights are necessary when a windbreak is planned and designed.

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

Forestland

Assistance in establishing, improving, or managing forestland is available from foresters or natural resources specialists.

Forestland Management and Productivity

Information about the productivity and management of the forested map units in the survey area is given in table 10. This table can be used by forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed.

Woodland Ordination System

Table 10 lists the *ordination symbol* (woodland suitability) for each soil. The ordination system is a nationwide uniform system of labeling soils or groups of soils that are similar in use and management. The primary factors evaluated in the woodland ordination system are productivity of the forest overstory tree species and the principal soil properties resulting in hazards and limitations that affect forest management. There are three parts of the ordination system: class, subclass, and group. The class and subclass are referred to as the ordination symbol.

Ordination Class Symbol

The first element of the ordination symbol is a number that denotes the potential productivity in terms of cubic meters of wood per hectare per year for the indicator tree species. The larger the number, the greater the potential productivity. Potential productivity is based on site index and the corresponding culmination of mean annual increment. For example, the number 1 indicates a potential production of 1 cubic meter of wood per hectare per year (14.3 cubic feet per

acre per year) and 10 indicates a potential production of 10 cubic meters of wood per hectare per year (143 cubic feet per acre per year).

Indicator species is a species that is common in the area and is generally, but not necessarily, the most productive on the soil. It is the species that determines the ordination class. It is the first species listed for a particular map unit in table 10. This table shows the productivity for all species where data have been collected.

Site index is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The site indexes shown in table 10 are averages based on measurements made at sites that are representative of the soil series. When the site index and forestland productivity of different soils are compared, the values for the same tree species should be compared. The higher the site index number, the more productive the soil for that species. Site index values are used in conjunction with yield tables to determine average annual yields. Indirectly, they are used to determine the productivity class in the ordination class symbol.

Ordination Subclass Symbol

The second element of the ordination symbol, or subclass, is a capital letter that indicates certain soil or physiographic characteristics that contribute to important hazards or limitations to be considered in management. The subclasses are defined as follows:

Subclass X indicates that forestland use and management are limited by stones or rocks.

Subclass W indicates that forestland use and management are significantly limited by excess water, either seasonally or throughout the year. Restricted drainage, a high water table, or flooding can adversely affect either stand development or management.

Subclass T indicates that the root zone has toxic substances. Excessive alkalinity, acidity, sodium salts, or other toxic substances impede the development of desirable species.

Subclass D indicates that forestland use and management are limited by a restricted rooting depth. The rooting depth is restricted by hard bedrock, a hardpan, or other restrictive layers in the soil.

Subclass C indicates that forestland use and management are limited by the kind or amount of clay in the upper part of the soil.

Subclass S indicates that the soil is sandy, has a low available water capacity, and normally has a low content of available plant nutrients. The use of equipment is limited during dry periods.

Subclass F indicates that forestland use and management are limited by a high content of rock fragments that are larger than 2 millimeters and smaller than 10 inches. This subclass includes flaggy soils.

Subclass R indicates that forestland use and management are limited by excessive slope.

Subclass A indicates that no significant limitations affect forestland use and management.

Management Concerns

In table 10, the soils are rated for the erosion hazard, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition.

The *erosion hazard* is *slight* if the expected soil loss is small; *moderate* if some measures are needed to control erosion during logging and road construction; and *severe* if intensive management or special equipment and methods are needed to prevent excessive soil loss.

The *equipment limitation* is *slight* if the use of equipment is not limited to a particular kind of equipment or time of year; *moderate* if there is a short seasonal limitation or a need for some modification in the management of equipment; and *severe* if there is a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings are for seedlings that are from a good planting stock and that are properly planted during a period of average rainfall. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate,* 25 to 50 percent; and *severe,* more than 50 percent.

Windthrow hazard is *slight* if trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate* if some trees are blown down during periods of excessive soil wetness and strong winds; and *severe* if many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Plant competition is *slight* if there is little or no competition from other plants; *moderate* if plant competition is expected to hinder the development of a fully stocked stand of desirable trees; and *severe* if plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

Potential Productivity

In table 10, the *potential productivity* of merchantable or *common trees* is expressed as a site index and as a

volume number. The *site index* is the average height, in feet, that dominant and codominate trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. The first species listed under common trees for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class. More detailed information regarding site index is available in the "National Forestry Manual," which is available in offices of the Natural Resources Conservation Service or on the Internet.

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

The column *suggested trees to plant* lists trees that are suitable for commercial wood production and are suited to the soils.

Recreation

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In the table, 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 can be 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 a combination of these.

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

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

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

permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or to a cemented pan, permeability, and toxic substances in the soil.

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

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

The interpretative ratings in this table help engineers, planners, and others to understand how soil properties influence recreational uses. Ratings for proposed uses are given in terms of limitations. Only the most restrictive features are listed. Other features may limit a specific recreational use.

Wildlife Habitat

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

Elements of Wildlife Habitat

In table 12, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, bromegrass, timothy, orchardgrass, clover, bluegrass, alfalfa, trefoil, reed canarygrass, and crownvetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, ragweed, pokeweed, sheep sorrel, docks, crabgrass, and dandelion.

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, wild cherry, sweetgum, willow, black walnut, apple, hawthorn, dogwood, hickory, hazelnut, blackberry, elderberry and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are hawthorn, honeysuckle, American plum, redosier dogwood, chokecherry, serviceberry, 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, hemlock, fir, yew, cedar, larch, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

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, pondweed, spikerush, wild millet, rushes, sedges, bulrushes, wild rice, arrowhead, waterplantain, pickerelweed, algae cordgrass, and cattail.

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 muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

Kinds of Wildlife Habitat

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

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

Habitat for forestland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, thrushes, woodpeckers, owls, tree squirrels, porcupine, raccoon and white-tailed 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, bitterns, rails, kingfishers, muskrat, otter, mink, and beaver.

Areas where major land uses or cover types adjoin ae called “edge habitat.” A good example is the border between dense forestland and a field of no-till corn. Although not rated in the table, edge habitat is of primary importance to animals from the smallest songbirds to white-tailed deer. Most of the animals that inhabit areas of openland or forestland also frequent edge habitat, and desirable edge areas are consistently used by 10 times as many animals as are the centers of large areas of forestland or cropland.

Hydric Soils

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

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Buol and others, 1980; Cowardin and others, 1979; National Research Council, 1995; and Tiner, 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

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

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). These criteria are used to identify a phase of a soil series that

normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2003) and in the "Soil Survey Manual" (Soil Survey Division, 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators that can be used to make onsite determinations of hydric soils in Perry County are specified in "Field Indicators of Hydric Soils in the United States" (USDA, 1998).

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

The following map units meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; USDA, 1998).

BodAH—Bonnie silt loam, 0 to 1 percent slopes, frequently flooded, brief duration
BodAM—Bonnie silt loam, ponded, 0 to 1 percent, slopes, frequently flooded, brief duration
GhaA—Ginat silt loam, 0 to 1 percent slopes
PkaAH—Petrolia silty clay loam, 0 to 1 percent slopes, frequently flooded, brief duration
ZcaA—Zipp silty clay, 0 to 1 percent slopes

Map units that are made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions of the landform, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions of the landform.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data data in the tables described under the heading "Soil Properties."

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

Table 13 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are 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, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 14 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. It also shows the suitability of the soils for use as a daily cover for landfill.

Soil properties are important in selecting sites for sanitary facilities and in identifying limiting soil properties and site features to be considered in planning, design, and installation. Soil limitation ratings of *slight, moderate,* or *severe* are given for septic tank absorption fields, sewage lagoons, and trench and area sanitary landfills. Soil suitability ratings of *good, fair,* and *poor* are given for daily cover for landfill.

A rating of *slight* or *good* indicates that the soils have no limitations or that the limitations can be easily overcome. Good performance and low maintenance can be expected. A rating of *moderate* or *fair* indicates that the limitations should be recognized but generally can be overcome by good management or special design. A rating of *severe* or *poor* indicates that overcoming the limitations is difficult or impractical. Increased maintenance may be required.

Septic tank absorption fields are areas in which subsurface systems of tile or perforated pipe distribute

effluent from a septic tank into the natural soil. The centerline of the tile is assumed to be at a depth of 24 inches. Only the part of the soil between a depth of 24 and 60 inches is considered in making the ratings. The soil properties and site features considered are those that affect the absorption of the effluent, those that affect the construction and maintenance of the system, and those that may affect public health.

The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock 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.

Individuals need to contact the Perry County Health Department for procedures and local septic codes to determine site feasibility for septic tank absorption fields.

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, relatively impervious soil material. Aerobic lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Relatively impervious soil material for the lagoon floor and sides is desirable to minimize seepage and contamination of local ground water.

Table 14 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and generally 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

A *trench sanitary landfill* is an area where solid waste is disposed of by placing refuse in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil that is excavated from the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. Soil properties that influence the risk of pollution, the ease of excavation, trafficability, and revegetation are the major considerations in rating the soils.

An *area sanitary landfill* is an area where solid waste is disposed of by placing refuse in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil that is imported from a source away from the site. A final cover of soil at least 2 feet thick is placed over the completed landfill. Soil properties that influence trafficability, revegetation, and the risk of pollution are the main considerations in rating the soils for area sanitary landfills.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. The ratings in the table 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 sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The suitability of a soil for use as cover is based on properties that affect workability and the ease of digging, moving, and spreading the material over the refuse daily during both wet and dry periods.

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 daily 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 or to 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.

Waste Management

Soil properties are important when organic waste is applied as fertilizer and wastewater is applied in irrigated areas. They also are important when the soil is used as a medium for the treatment and disposal of the organic waste and wastewater. Unfavorable soil properties can result in environmental damage.

The use of organic waste and wastewater as production resources results in the conservation of energy and resources and minimizes the problems associated with waste disposal. If disposal is the goal, applying a maximum amount of the organic waste or the wastewater to a minimal area holds costs to a minimum and environmental damage is the main hazard. If reuse is the goal, a minimum amount should be applied to a maximum area and environmental damage is unlikely.

Interpretations developed for waste management may include ratings for manure- and food-processing waste, municipal sewage sludge, use of wastewater for irrigation, and treatment of wastewater by slow rate, overland flow, and rapid infiltration processes.

Specific information regarding waste management is available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Construction Materials

Table 15 gives information about the soils as potential sources 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.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In the 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 when the soil material is excavated and spread. Many soils have layers of contrasting suitability within their profile. Table 15 provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have one or more of the following characteristics—a plasticity index of more than 10, a high shrink-swell potential, many stones, slopes of more than 25 percent, or a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 15, only the probability of finding material in suitable quantity in or below the soil 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 has 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. Fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40

inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils; loamy soils that have a relatively high content of clay; soils that have only 20 to 40 inches of suitable material; soils that have an appreciable amount of gravel, stones, or soluble salts; or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey; have less than 20 inches of suitable material; have a large amount of gravel, stones, or soluble salts; have slopes of more than 15 percent; or have a seasonal high water table at or near the surface.

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

Water Management

Table 16 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; embankments, dikes, and levees; and aquifer-fed excavated ponds. 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 more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

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

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 or to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

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 control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion 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 wind erosion, 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.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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

The estimates of soil properties are shown in the tables including the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

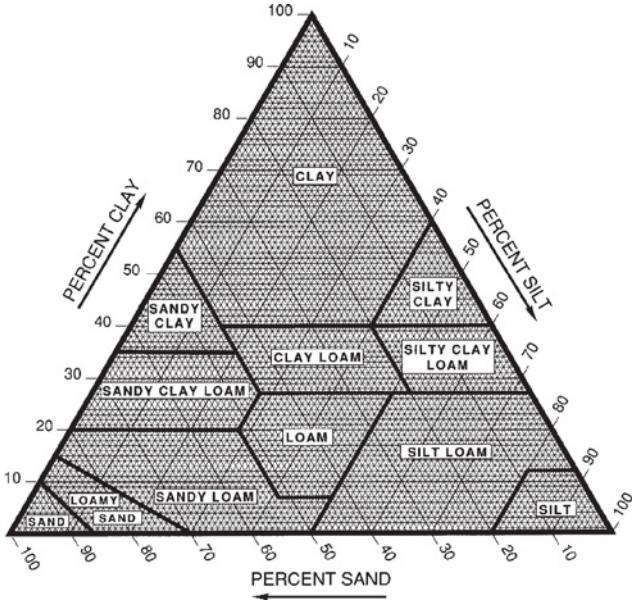

Figure 11.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 17 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 11). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

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

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to 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.

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

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

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

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

Physical Properties

Table 18 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 18, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

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

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

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

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For

others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low,* a change of less than 3 percent; *moderate,* 3 to 6 percent; and *high,* more than 6 percent; and *very high,* more than 9 percent.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 18, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Erosion factors are shown in table 18 as the K factor (Kw and Kf) and the T factor. *Erosion factor K* indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

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

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

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. Descriptions of the groups are available in the “National Soil Survey Handbook” (USDA, 2003).

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

Chemical Properties

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

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

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Water Features

Table 20 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

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, and water standing in swamps and marshes is considered ponding rather than flooding.

The table 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, or frequent. *None* means that flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are depth to the seasonal high water table, the kind of water table, and the months of the year when the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

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.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. Three dashes "---" indicate that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. *Maximum ponding depth* refers to the depth of the water above the surface of the soil.

Soil Features

Table 21 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

Depth to bedrock is given if bedrock is within a depth of 80 inches. The depth is based on many soil borings and on observations during soil mapping. The

rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Soil slippage potential is the susceptibility of a soil mass to movement downslope when loaded, excavated, or wet. Soil slippage is caused by several natural factors, and the potential is greatly increased by human activity. Type of bedrock and depth to bedrock, slope gradient, landform position, clay mineralogy, and the shrink-swell potential are the most important natural factors. Shallow soils that formed in shale, have clay mineralogy, have a high shrink-swell potential, are on steep slopes, and are on footslopes or backslopes are the most susceptible to soil slippage (fig. 12).

Soils that have a *medium* or *high* slippage potential are even more susceptible to slippage where certain types of human activity take place. Factors that increase the potential for soil slippage include making cuts in hillsides during construction of roadbeds and houses; concentrating water by changing surface water runoff patterns, or allowing water to concentrate from leaking water and sewer lines; increasing weight on slopes by building structures or placing fill for building sites; changing the course of streams, increasing stream flow, or removing rock from the stream bed, causing the base of slopes to be undercut; and removing vegetation.

Soil slippage causes damage to roads and structures and can endanger human life. Areas that have slipped are susceptible to additional slippage and are generally too unstable for most construction uses.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on

Figure 12.—This roadbed has slipped downslope and will need to be repaired. The roadway is in an area of Ebal soils. Ebal soils have a high potential for slippage.

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.

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a *moderate* potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength; and a *high* potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2003). 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 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalf (*Hapl*, meaning minimal horizination, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, active, mesic Typic Hapludalfs.

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

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff, 1999) and in "Keys to Soil Taxonomy" (Soil Survey Staff, 2003). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Adyeville Series

Taxonomic classification: Coarse-loamy, mixed, semiactive, mesic Typic Hapludults

Typical Pedon for the Series

Adyeville very fine sandy loam, on a slope of 40 percent, in a wooded area; 450 feet south and 300 feet west of the northeast corner of sec. 3, T. 4 S., R. 3 W.; Perry County, Indiana.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) very fine sandy loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; many fine and medium roots throughout; 2 percent strongly cemented sandstone channers; extremely acid; abrupt smooth boundary.

E—3 to 9 inches; light yellowish brown (10YR 6/4) very fine sandy loam, very pale brown (10YR 7/3) dry; weak fine subangular blocky structure; friable; many fine and medium roots throughout; 2 percent strongly cemented sandstone channers; extremely acid; clear wavy boundary.

Bt1—9 to 17 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine and medium roots throughout; common faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds and in pores; 7 percent strongly cemented sandstone channers; extremely acid; clear wavy boundary.

Bt2—17 to 24 inches; strong brown (7.5YR 5/6) channery loam; moderate medium subangular blocky structure; friable; common fine roots between peds; many distinct discontinuous yellowish brown (10YR 5/4) and common faint discontinuous yellowish red (5YR 5/6) clay films on faces of peds and in pores; 20 percent strongly cemented sandstone channers; extremely acid; clear wavy boundary.

Cr—24 to 60 inches; weakly cemented and moderately cemented sandstone interbedded with siltstone, shale, and very strongly cemented sandstone.

Series Range in Characteristics

Depth to the base of the argillic horizon: 20 to 40 inches

Depth to paralithic contact: 20 to 40 inches

Kind of rock fragments: Strongly or very strongly cemented sandstone

A or Ap horizon:
- Color—hue of 10YR, value of 2 or 3, and chroma of 1 to 3 (A); hue of 10YR, value of 3 to 5, and chroma of 2 to 4 (Ap)
- Texture—silt loam, loam, or very fine sandy loam
- Content of rock fragments—0 to 15 percent channers
- pH range—3.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

E or BE horizon:
- Color—hue of 10YR, value of 4 to 6, and chroma of 2 to 4
- Texture—loam or very fine sandy loam; less commonly silt loam
- Content of rock fragments—0 to 15 percent channers
- pH range—3.5 to 5.5

Bt horizon:
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
- Texture—loam, fine sandy loam, or very fine sandy loam or the channery analogs of these textures; less commonly silt loam or channery silt loam
- Content of rock fragments—5 to 35 percent channers
- pH range—3.5 to 5.5

Cr horizon:
- Kind of bedrock—weakly and moderately cemented sandstone interbedded with siltstone and shale and strongly or more cemented sandstone layers

Alford Series

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

Typical Pedon for the Series

Alford silt loam, on a convex, east-facing slope of 4 percent, in a cultivated field; 2,200 feet southwest and 1,200 feet southeast of the northwest corner of donation 162, T. 2 N., R. 9 W.; Knox County, Indiana.

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

Bt1—6 to 9 inches; brown (7.5YR 5/4) silty clay loam; weak medium subangular blocky structure; friable; few fine roots; common faint patchy brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—9 to 22 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; many distinct continuous reddish brown (5YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—22 to 32 inches; brown (7.5YR 4/4) silty clay loam; moderate coarse subangular blocky structure; firm; few fine roots; many distinct continuous reddish brown (5YR 4/4) clay films on faces of peds; common medium black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

Bt4—32 to 72 inches; brown (7.5YR 4/4) silt loam; weak coarse subangular blocky structure; friable;

common distinct discontinuous reddish brown (5YR 4/4) clay films on faces of peds; 1 percent sand; strongly acid; gradual wavy boundary.
2BC—72 to 80 inches; brown (7.5YR 4/4) silt loam; weak coarse subangular blocky structure; friable; 22 percent sand; moderately acid.

Series Range in Characteristics

Depth to the base of the argillic horizon: 44 to 80 inches

A or Ap horizon:
Color—hue of 10YR, value of 4, and chroma of 2 or 3; value of 5 and chroma of 6 in severely eroded pedons
Texture—silt loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—silt loam or silty clay loam
pH range—4.5 to 5.5

2BC or BC horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—silt loam
pH range—4.5 to 6.5

Alvin Series

Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Hapludalfs
*Taxadjunct features:*The Alvin soils in this survey area have a lower cation-exchange capacity than is typical for the series. This difference, however, does not affect the usefulness or behavior of the soils.

Typical Pedon for the MLRA

Alvin loam, on a slope of 7 percent, in a cultivated field; 1,100 feet south and 1,950 feet west of the northeast corner of sec. 26, T. 5 S., R. 1 W.; Perry County, Indiana.

Ap—0 to 11 inches; dark yellowish brown (10YR 4/4) loam, light brown (10YR 6/4) dry; weak fine subangular blocky structure; friable; common fine roots; very strongly acid; abrupt smooth boundary.
Bt1—11 to 25 inches; strong brown (7.5YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine roots; many distinct continuous dark yellowish brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear wavy boundary.
Bt2—25 to 31 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate fine subangular blocky structure; friable; many distinct continuous dark yellowish brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.
E and Bt1—31 to 74 inches; 80 percent strong brown (7.5YR 5/6) loamy sand (E); weak medium subangular blocky structure; very friable; 20 percent strong brown (7.5YR 5/6) sandy loam (Bt) lamellae; friable; common distinct discontinuous brown (7.5YR 4/4) clay bridges between sand grains; strongly acid; clear wavy boundary.
E and Bt2—74 to 80 inches; 90 percent yellowish brown (10YR 5/4) loamy sand (E); weak medium subangular blocky structure; single grain; loose; 10 percent brown (7.5YR 4/4) loamy sand and sandy loam (Bt) lamellae; very friable; few distinct discontinuous brown (7.5YR 4/4) clay bridges between sand grains; strongly acid.

MLRA Range in Characteristics

Depth to the base of the argillic horizon: 40 to more than 80 inches

A or Ap horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 4 (A); hue of 10YR, value of 3 or 4, and chroma of 3 or 4 (Ap)
Texture—loam
pH range—4.5 to 7.3; depends upon liming history

E or BE horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4
Texture—fine sandy loam, loamy fine sand, or loamy sand
pH range—5.1 to 6.5

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, chroma of 3 to 6
Texture—fine sandy loam, sandy loam, loam, or thin layers of sandy clay loam; includes loamy fine sand or loamy sand in the lower part
pH range—5.1 to 6.5

E part of the E and Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 6
Texture—sandy loam, loamy sand, or sand or the fine analogs of these textures
pH range—5.1 to 6.5

Bt part of the E and Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6

Texture—sandy loam, loamy sand, or sand or the fine analogs of these textures
pH range—5.1 to 6.5

C horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6
Texture—fine sand, sand, or loamy fine sand; includes thin strata of silt, sandy loam, or fine sandy loam
pH range—5.1 to 6.5

Apalona Series

Taxonomic classification: Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs

Typical Pedon for the Series

Apalona silt loam, on a slope of 3 percent, in a cultivated field; 1,050 feet west and 1,450 feet north of the southeast corner of sec. 30, T. 4 S., R. 2 W.; Perry County, Indiana (fig. 13).

Ap—0 to 8 inches; brown (10YR 5/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots between peds; neutral; abrupt smooth boundary.

Bt1—8 to 16 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots between peds; many continuous faint strong brown (7.5YR 5/6) clay films on vertical and horizontal faces of peds; strongly acid; clear wavy boundary.

Bt2—16 to 22 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots between peds; many faint continuous yellowish brown (10YR 5/4) clay films on vertical and horizontal faces of peds; very strongly acid; clear wavy boundary.

Bt/E—22 to 25 inches; 75 percent brown (7.5YR 4/4) (Bt) and 25 percent light gray (10YR 7/2) (E) silt loam; weak fine prismatic structure parting to moderate fine angular blocky; firm; common fine roots between peds; few fine tubular pores; many discontinuous faint light brownish gray (10YR 6/2) clay films on vertical and horizontal faces of peds; very strongly acid; clear wavy boundary.

Btx1—25 to 35 inches; brown (7.5YR 4/4) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots in cracks; few fine tubular pores; common discontinuous faint yellowish brown (10YR 5/4) clay films on vertical and horizontal faces of peds; few continuous prominent light brownish gray (10YR 6/2) clay depletions on vertical faces of peds; few fine faint light yellowish brown (10YR 6/4) masses of iron accumulation in the matrix; brittle; very strongly acid; clear wavy boundary.

Figure 13.—Typical pedon of Apalona soil in a map unit of Apalona silt loam, 2 to 60 percent slopes. The upper part of this soil formed in loess and the lower part formed in residuum derived from interbedded shale, sandstone, and siltstone.

Btx2—35 to 49 inches; light yellowish brown (10YR 6/4) silt loam; weak very coarse prismatic structure parting to moderate medium subangular blocky; very firm; few patchy distinct dark yellowish brown (10YR 4/6) and few patchy distinct yellowish brown (10YR 5/4) clay films on vertical and horizontal faces of peds; common continuous prominent light brownish gray (10YR 6/2) clay depletions on vertical faces of peds; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1) masses of iron and manganese oxide concretions;

1 percent channers (sandstone); brittle; very strongly acid; clear smooth boundary.
2B't1—49 to 60 inches; brownish yellow (10YR 6/8) clay; strong medium subangular blocky structure; very firm; many continuous prominent brownish yellow (10YR 6/6) clay films on vertical and horizontal faces of peds; common medium light brownish gray (10YR 6/2) iron depletions in the matrix; many fine prominent yellowish red (5YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1) masses of iron and manganese oxide concretions; 5 percent channers (sandstone); very strongly acid; gradual wavy boundary.
2B't2—60 to 69 inches; brownish yellow (10YR 6/6) clay loam; strong coarse subangular blocky structure; firm; many continuous prominent reddish yellow (7.5YR 6/6) clay films on vertical and horizontal faces of peds; few fine prominent yellowish red (5YR 5/6) masses of iron accumulation in the matrix; many coarse prominent light brownish gray (10YR 6/2) iron depletions in the matrix; few fine prominent yellowish red (5YR 5/6) masses of iron accumulation in the matrix; 1 percent channers (sandstone); strongly acid; gradual wavy boundary.
3BC—69 to 90 inches; 60 percent strong brown (7.5YR 5/8) and 40 percent light brownish gray (10YR 6/2) loam; weak coarse subangular blocky structure; firm; very few patchy prominent grayish brown (10YR 5/2) clay films on vertical faces of peds; 5 percent channers (sandstone); strongly acid; clear wavy boundary.
3Cr—90 to 96 inches; interbedded weakly cemented shale with moderately and strongly cemented sandstone.

Series Range in Characteristics

Depth to the base of the argillic horizon: 60 to more than 80 inches
Depth to paralithic contact: 72 to more than 80 inches
Depth to a fragipan: 15 to 40 inches

A or Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
Texture—silt loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt part of the Bt or Bt/E horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—silt loam or silty clay loam
pH range—4.5 to 6.0

E part of the Bt or Bt/E horizon:
Color—hue of 10YR, value of 5 to 7, and chroma of 2 to 4
Texture—silt loam or silty clay loam
pH range—4.5 to 6.0

Btx horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6; iron or clay depletions present
Texture—silt loam, silty clay loam, or loam
Content of rock fragments—0 to 5 percent
pH range—4.5 to 5.5

2Bt or 2BC horizon (where present):
Color—hue of 7.5YR to 5Y, value of 5 to 7, chroma of 1 to 8; iron depletions present
Texture—commonly clay loam, silty clay, or clay; less commonly channery clay loam and the parachannery to extremely parachannery analogs of silty clay or clay
Content of rock fragments—0 to 25 percent
Content of pararock fragments—0 to 35 percent
pH range—4.5 to 5.5

3BC or 3Bt horizon (where present):
Color—hue of 7.5YR to 5Y, value of 5 to 7, chroma of 1 to 8; iron depletions present
Texture—sandy clay loam, sandy loam, very fine sandy loam, or loam; less commonly channery or very channery analogs of these textures
Content of rock fragments—0 to 35 percent
pH range—5.1 to 6.5

3Cr horizon:
Texture—weakly or moderately cemented shale, sandstone, and siltstone interbedded with strongly cemented to indurated sandstone

Bloomfield Series

Taxonomic classification: Sandy, mixed, mesic Lamellic Hapludalfs

Typical Pedon for the MLRA

Bloomfield loamy sand, on a slope of 6 percent, in an idle field; 1,050 feet west and 550 feet north of the southeast corner of sec. 29, T. 7 S., R. 2 W.; Perry County, Indiana.

Ap—0 to 4 inches, dark yellowish brown (10YR 4/4) loamy sand, light yellowish brown (10YR 6/4) dry; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.
E—4 to 17 inches; dark yellowish brown (10YR 4/6) loamy sand; weak fine granular structure; very

friable; common fine roots; strongly acid; gradual wavy boundary.

E and Bt—17 to 41 inches; 85 percent dark yellowish brown (10YR 4/6) sand; single grain; loose (E); 15 percent wavy and discontinuous brown (7.5YR 4/4) loamy fine sand lamellae (Bt) 1/16 to 3/8 inch in thickness, with a total thickness of about 3 inches; few fine roots; moderately acid; gradual wavy boundary.

Bt and E—41 to 80 inches; 55 percent wavy, continuous and discontinuous brown (7.5YR 4/4) loamy fine sand lamellae (Bt), variable in thickness; weak fine subangular blocky structure; very friable; 45 percent dark yellowish brown (10YR 4/6) (E); single grain; loose; moderately acid.

MLRA Range in Characteristics

Depth to the base of soil development: 60 to more than 80 inches

Thickness of lamellae: Combined thickness above a depth of 60 inches is more than 6 inches

A or Ap horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4
- Texture—loamy sand
- pH range—5.1 to 6.5 in nonlimed areas; ranges to 7.3 in limed areas

E horizon:
- Color—hue of 10YR, value of 4 to 6, and chroma of 3 to 6
- Texture—sand, loamy sand, fine sand, or loamy fine sand
- pH range—5.1 to 6.5 in nonlimed areas; ranges to 7.3 in limed areas

E part of E and Bt and Bt and E horizons:
- Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6
- Texture—fine sand, loamy fine sand, loamy sand, or sand

Bt part of E and Bt and Bt and E horizons (lamellae and banded layers):
- Color—hue of 10YR, 7.5YR, and 5YR; value of 3 to 5; and chroma of 3 to 6
- Texture—loamy fine sand, loamy sand, or fine sand; less commonly sand; a few lamellae are fine sandy loam or sandy loam
- pH range—5.1 to 6.0; ranges to 7.3 in the lower part

Bonnie Series

Taxonomic classification: Fine-silty, mixed, active, acid, mesic Typic Fluvaquents

Typical Pedon for the MLRA

Bonnie silt loam, on a slope of 0.5 percent, in a cultivated field; 1,160 feet west and 1,385 feet north of the center of sec. 9, T. 4 N., R. 7 E.; Scott County, Indiana.

Ap—0 to 9 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate medium granular structure; friable; common very fine roots; common fine distinct light brownish gray (10YR 6/2) iron depletions throughout; few fine rounded iron-manganese concretions throughout; slightly acid; abrupt smooth boundary.

Cg1—9 to 20 inches; light brownish gray (10YR 6/2) silt loam; weak coarse platy structure; friable; few very fine roots; common medium faint pale brown (10YR 6/3) masses of iron accumulation throughout; common prominent yellowish red (5YR 4/6) iron stains lining pores and root channels; few fine rounded iron and manganese concretions; common fine irregular iron nodules; slightly acid; gradual wavy boundary.

Cg2—20 to 31 inches; light gray (10YR 7/2) silt loam; massive; friable; few very fine roots; common medium prominent yellowish brown (10YR 5/6) and few medium distinct pale brown (10YR 6/3) masses of iron accumulation in the matrix; few prominent yellowish red (5YR 4/6) iron stains lining pores and root channels; few fine rounded iron and manganese concretions throughout; few fine irregular iron and manganese nodules; strongly acid; gradual wavy boundary.

Cg3—31 to 47 inches; gray (10YR 6/1) silt loam; massive; friable; few medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common prominent yellowish red (5YR 4/6) iron stains lining pores and root channels; few medium irregular iron and manganese concretions throughout; common fine irregular iron and manganese nodules; strongly acid; gradual wavy boundary.

Cg4—47 to 60 inches; light gray (10YR 7/1) silt loam; massive; friable; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common prominent yellowish red (5YR 5/8) iron stains lining pores; common fine irregular iron and manganese nodules; strongly acid.

MLRA Range in Characteristics

A or Ap horizon:
- Color—hue of 10YR, value of 4 to 6, and chroma of 1 to 3
- Texture—silt loam

pH range—4.5 to 7.3; depends upon liming history

Cg horizon:
Color—hue of 10YR, 2.5Y, or N; value of 5 to 7; and chroma of 0 to 2
Texture—silt loam; includes silty clay loam below a depth of 40 inches
pH range—4.5 to 5.5 between a depth of 20 to 40 inches; 4.5 to 6.5 above a depth of 20 inches and below a depth of 40 inches

Branchville Series

Taxonomic classification: Fine, mixed, active, mesic, Aquic Hapludalfs

Typical Pedon for the Series

Branchville channery loam, on a slope of 23 percent, in a wooded area; 1,000 feet east and 600 feet south of the northwest corner of sec. 7, T. 4 S., R. 1 W.; Perry County, Indiana.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) channery loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine roots; 20 percent sandstone channers; slightly acid; clear wavy boundary.
BA—3 to 23 inches; brown (10YR 4/3) extremely flaggy loam; weak fine subangular blocky structure; friable; many fine to coarse roots; 50 percent flagstones; 10 percent stones; 5 percent sandstone channers; moderately acid; clear wavy boundary.
2Bt1—23 to 29 inches; pale brown (10YR 6/3) very channery clay loam; moderate fine subangular blocky structure; firm; common fine roots; many discontinuous distinct light brownish gray (10YR 6/2) clay films on faces of peds; many medium prominent brown (7.5YR 4/4) masses of iron accumulation in the matrix; common black (10YR 2/1) iron and manganese concretions; 50 percent sandstone channers; moderately acid; clear wavy boundary.
3Bt2—29 to 38 inches; yellowish brown (10YR 5/6) clay; strong medium subangular blocky structure; firm; few fine roots; many distinct discontinuous light gray (10YR 7/1) clay films on faces of peds; many medium prominent light gray (10YR 7/1) iron depletions in the matrix; many medium distinct yellowish red (5YR 4/6) masses of iron accumulation in the matrix; 2 percent sandstone channers (3/4 inch to 3 inches); very strongly acid; abrupt wavy boundary.
3Btg1—38 to 47 inches; gray (10YR 6/1) clay; strong medium subangular blocky structure; firm; few fine roots; many distinct continuous gray (10YR 6/1) clay films on faces of peds; many medium prominent yellowish red (5YR 4/6) and yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; 2 percent shale parachanners; strongly acid; gradual wavy boundary.
3Btg2—47 to 55 inches; gray (10YR 6/1) silty clay; strong medium subangular blocky structure; firm; few fine roots; many distinct continuous gray (10YR 6/1) clay films on faces of peds; many medium prominent yellowish red (5YR 4/6) and yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; 2 percent shale parachanners; slightly acid; gradual wavy boundary.
3CBg—55 to 80 inches; gray (10YR 6/1) extremely parachannery silty clay; strong thin platy structure; firm; few fine roots; 74 percent shale parachanners; slightly alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon: 50 to more than 80 inches
Depth to paralithic contact: More than 80 inches
Depth to the 3Bt horizon: 20 to 40 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 3
Texture—channery loam
Content of rock fragments—15 to 35 percent channers
pH range—5.1 to 6.5

BA horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 3 to 6
Texture—channery, very channery, extremely channery, flaggy, or very flaggy; extremely flaggy analogs of loam or sandy loam
Content of rock fragments—15 to 80 percent sandstone channers or flagstones
pH range—5.1 to 6.5

2Bt horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 3 to 6
Texture—channery, very channery, flaggy, and very flaggy analogs of clay loam or sandy clay loam
Content of rock fragments—15 to 60 percent sandstone channers or flagstones
pH range—5.1 to 6.5

3Bt or 3Btg horizon:
Color—hue of 5YR to 2.5Y, value of 5 to 7, and chroma of 1 to 6
Texture—clay or silty clay

Content of pararock fragments—0 to 15 percent shale parachanners
pH range—4.5 to 7.3

3CBg horizon:
Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4
Texture—very parachannery or extremely parachannery analogs of clay or silty clay
Content of pararock fragments—35 to 75 percent shale parachanners
pH range—6.1 to 7.8

Combs Series

Taxomonic classification: Coarse-loamy, mixed, active, mesic Fluventic Hapludolls

Typical Pedon for the Series

Combs fine sandy loam, on a smooth slope of 2 percent, in a cultivated field; near the mouth of Oldhouse Branch on the North Fork of the Kentucky River, about 1.3 miles south of Chavies; Perry County, Kentucky.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) rubbed, fine sandy loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure parting to moderate fine granular; very friable; few fine roots and pores; few wormcasts; 2 percent fine pebbles; moderately acid; clear smooth boundary.
A—8 to 23 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure parting to moderate fine granular; very friable; common fine roots; common fine pores; few wormcasts; 4 percent fine pebbles; moderately acid; clear smooth boundary.
Bw1—23 to 44 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate coarse prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common fine pores; many continuous organic coatings on faces of peds and in pores; slightly acid; gradual smooth boundary.
Bw2—44 to 64 inches; yellowish brown (10YR 5/6) loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common fine pores; many continuous organic coatings on faces of peds and in pores; slightly acid; gradual smooth boundary.
Bw3—64 to 80 inches; yellowish brown (10YR 5/6) loam; moderate very coarse prismatic structure parting to weak medium subangular blocky; friable; few fine pores; common continuous organic coatings on faces of peds and in pores; slightly acid.

Series Range in Characteristics

Depth to the base of the cambic horizon: 40 to more than 80 inches
Thickness of the mollic epipedon: 10 to 24 inches

A or Ap horizon:
Color—hue of 10YR or 7.5YR, value of 3, and chroma of 2 or 3
Texture—fine sandy loam or loam
pH range—5.6 to 7.8

Bw horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—loam, fine sandy loam, or sandy loam; includes silt loam or sandy clay loam below a depth of 40 inches
pH range—5.6 to 7.8

Cuba Series

Taxonomic classification: Fine-silty, mixed, active, mesic Fluventic Dystrudepts

Typical Pedon for the Series

Cuba silt loam, in a nearly level area in a cultivated field; 1,710 feet north and 210 feet east of the center of sec. 28, T. 1 N., R. 3 W.; Dubois County, Indiana.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.
Bw1—10 to 21 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; few discontinuous brown (10YR 4/3) organic coatings on faces of peds; very strongly acid; gradual wavy boundary.
Bw2—21 to 47 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure parting to moderate medium granular; friable; very strongly acid; clear wavy boundary.
C—47 to 60 inches; brown (10YR 5/3) silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; massive; friable; few fine distinct black (10YR 2/1) iron and manganese concretions; very strongly acid.

Series Range in Characteristics

Depth to the base of the cambic horizon: 30 to 54 inches

A or Ap horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 1 or 2 (A—1 or 2 inches thick); hue of 10YR, value of 4 or 5, and chroma of 2 to 4 (Ap)
- Texture—silt loam
- Content of rock fragments—0 to 3 percent pebbles
- pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bw horizon:
- Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6
- Texture—silt loam
- Content of rock fragments—0 to 3 percent pebbles
- pH range—4.5 to 5.5

C horizon:
- Color—hue of 10YR, value of 4 to 6, and chroma of 3 to 6
- Texture—silt loam or loam; includes sandy loam or fine sandy loam with thin strata of loamy sand below a depth of 40 inches
- Content of rock fragments—0 to 14 percent pebbles
- pH range—4.5 to 5.5

Deuchars Series

Taxonomic classification: Fine-silty, mixed, active, mesic Oxyaquic Hapludalfs

Typical Pedon for the Series

Deuchars silt loam, on a slope of 15 percent, in a wooded area; 2,400 feet east and 2,690 feet south of the northwest corner of sec. 5, T. 4 S., R. 1 W.; Perry County, Indiana.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

A2—2 to 6 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.

EB—6 to 10 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

Bt1—10 to 18 inches; strong brown (7.5YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common fine and medium roots; few faint discontinuous strong brown (7.5YR 5/6) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—18 to 23 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; many faint continuous strong brown (7.5YR 5/6) clay films on faces of peds; common distinct patchy light yellowish brown (10YR 6/4) silt coatings on faces of peds; very strongly acid; clear wavy boundary.

Bt3—23 to 30 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; many faint continuous strong brown (7.5YR 5/6) clay films on faces of peds; many distinct patchy light yellowish brown (10YR 6/4) silt coatings on faces of peds; 5 percent sandstone parachanners; very strongly acid; clear wavy boundary.

2Bt4—30 to 33 inches; light yellowish brown (10YR 6/4) clay; strong angular blocky structure; firm; few fine roots; many faint continuous light yellowish brown (10YR 6/4) clay films on faces of peds; few distinct discontinuous light brownish gray (10YR 6/2) clay depletions on faces of peds and few fine iron depletions in the matrix; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; very strongly acid; clear wavy boundary.

2Bt5—33 to 41 inches; strong brown (7.5YR 5/6) clay; strong medium angular blocky structure; firm; few fine roots; common distinct continuous yellowish brown (10YR 5/6) and many prominent continuous gray (10YR 6/1) clay films on faces of peds; many medium prominent gray (10YR 6/1) iron depletions in the matrix; very strongly acid; clear wavy boundary.

2Bt6—41 to 55 inches; yellowish brown (10YR 5/6) clay; strong medium angular blocky structure; firm; few fine roots; many faint continuous yellowish brown (10YR 5/6) and many prominent continuous gray (10YR 6/1) clay films on faces of peds; many medium prominent gray (5Y 6/1) iron depletions in the matrix; very strongly acid; clear wavy boundary.

2BC—55 to 62 inches; yellowish brown (10YR 5/6) parachannery clay; weak fine angular blocky structure; firm; many medium prominent gray (5YR 6/1) iron depletions in the matrix; 20 percent shale parachanners fragments; very strongly acid; clear wavy boundary.

2Cr—62 to 80 inches; weakly cemented shale.

Series Range in Characteristics

Depth to the base of the argillic horizon: 48 to more than 80 inches
Depth to paralithic contact: 60 to more than 80 inches

A or Ap horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3 (A); hue of 10YR, value of 4 or 5, and chroma of 3 to 6 (Ap)
Texture—silt loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

EB horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 to 5
Texture—silt loam
pH range—4.5 to 5.5

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—silt loam or silty clay loam
pH range—3.5 to 5.5

2Bt horizon:
Color—hue of 5YR to 5Y, value of 5 or 6, and chroma of 1 to 6; redoximorphic features present
Texture—silty clay loam, silty clay, or clay or the parachannery analogs of these textures
Content of pararock fragments—0 to 25 percent parachanners
pH range—3.5 to 5.5; ranges to 6.0 in the lower part

2BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 1 to 6; redoximorphic features present
Texture—silty clay or clay or the parachannery analogs of these textures
Content of pararock fragments—0 to 25 percent parachanners
pH range—4.5 to 7.3

Cr horizon:
Texture—weakly or moderately cemented shale interbedded with thin layers of sandstone

Ebal Series

Taxonomic classification: Fine, mixed, active, mesic Oxyaquic Hapludalfs

Typical Pedon for the Series

Ebal silt loam, on a convex, south-facing slope of 15 percent, in a wooded area; 2,060 feet south and 920 feet east of the northwest corner of sec. 8, T. 7 N., R. 2 W.; Monroe County, Indiana.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine, medium, and coarse roots; 10 percent sandstone channers; strongly acid, clear smooth boundary.
BE—3 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; many fine, medium, and coarse roots; 10 percent sandstone channers, 3 percent greater than $^3/_4$ inch in length; strongly acid; clear wavy boundary.
Bt1—8 to 13 inches; yellowish brown (10YR 5/4) channery silty clay loam; moderate medium subangular blocky structure; firm; common fine and medium roots; common faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; 23 percent sandstone channers; very strongly acid; clear wavy boundary.
2Bt2—13 to 21 inches; yellowish brown (10YR 5/4) very channery silty clay; moderate medium subangular blocky structure; firm; common fine and medium roots; common faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; 38 percent sandstone channers; very strongly acid; clear wavy boundary.
2Bt3—21 to 41 inches; red (2.5YR 4/6) clay; strong medium angular blocky structure; firm; few fine and medium roots; common distinct discontinuous yellowish brown (10YR 5/6) clay films on faces of peds; many prominent medium gray (10YR 6/1) iron depletions in the matrix; very strongly acid; clear wavy boundary.
2Bt4—41 to 48 inches; yellowish brown (10YR 5/4) clay; moderate medium angular blocky structure; firm; few fine and medium roots; common distinct discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; many coarse distinct gray (10YR 6/1) iron depletions and many coarse prominent red (2.5YR 4/6) masses of iron accumulation in the matrix; very strongly acid; clear wavy boundary.
2Bt5—48 to 61 inches; yellowish brown (10YR 5/4) clay; moderate medium angular blocky structure; firm; few fine and medium roots; common dark gray (10YR 4/1) and brown (10YR 5/3) slickensides; many coarse distinct gray (10YR 6/1) iron depletions and strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; strongly acid; gradual wavy boundary.
2Cr—61 to 80 inches; gray (10YR 6/1) moderately cemented shale; many distinct brown (7.5YR 4/4) iron coatings on shale fragments; strongly acid.

Series Range in Characteristics

Depth to the base of the argillic horizon and to paralithic contact: 50 to more than 80 inches

A, Ap, or BE horizon:
- Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4
- Texture—silt loam or silty clay loam
- Content of rock fragments—0 to 12 percent
- pH range—4.5 to 7.3; depends upon liming history

Bt horizon:
- Color—hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6
- Texture—silt loam, loam, or silty clay loam or the channery or very channery analogs of these textures
- Content of rock fragments—0 to 40 percent
- pH range—4.5 to 5.5

2Bt or 2BC horizon:
- Color—hue of 5Y to 2.5YR, value of 4 to 6, and chroma of 1 to 8
- Texture—clay or silty clay; includes channery and very channery analogs of these textures in the upper part
- Content of rock fragments—0 to 40 percent in the upper part; 0 to 5 percent in the lower part
- pH range—3.5 to 6.0 in the upper part; ranges to 7.3 in the lower part

2Cr horizon:
- Color—hue of 5Y to 7.5YR, value of 5 or 6, and chroma of 1

Elk Series

Taxonomic classification: Fine-silty, mixed, active, mesic Ultic Hapludalfs

Typical Pedon for the MLRA

Elk silt loam, moderately wet substratum, in a nearly level area in a cultivated field; 2,300 feet west and 2,600 feet north of the southeast corner of sec. 13, T. 4 S., R. 4 W.; Perry County, Indiana.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

BE—8 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; slightly acid; clear wavy boundary.

Bt1—14 to 35 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; many distinct patchy dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—35 to 49 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; common distinct patchy dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC1—49 to 62 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few distinct discontinuous very dark brown (10YR 2/2) iron and manganese stains on faces of peds; common medium distinct light brownish gray (10YR 6/2) iron depletions, and many medium distinct strong brown (7.5YR 4/6) masses of iron accumulation in the matrix; very strongly acid; gradual wavy boundary.

2BC2—62 to 70 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; common distinct discontinuous very dark brown (10YR 2/2) iron and manganese stains on faces of peds; common medium distinct light brownish gray (10YR 6/2) iron depletions, and few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; very strongly acid; gradual wavy boundary.

2C—70 to 80 inches; yellowish brown (10YR 5/6) sandy loam; massive; very friable; common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; very strongly acid.

MLRA Range in Characteristics

Depth to the base of the argillic horizon: 40 to more than 60 inches

A or Ap horizon:
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4
- Texture—silt loam
- pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt or BE horizon:
- Color—10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6; redoximorphic depletions below a depth of 40 inches
- Texture—silt loam
- pH range—4.5 to 5.5 in nonlimed areas; ranges to 6.5 in limed areas in the upper part

BC horizon:
- Color—10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6; redoximorphic depletions present
- Texture—silt loam
- Content of rock fragments—0 to 5 percent pebbles
- pH range—4.5 to 6.0

2BC or 2C horizon:
Color—10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8; redoximorphic depletions present
Texture—loam, sandy loam, or silt loam
Content of rock fragments—0 to 15 percent pebbles
pH range—4.5 to 6.0

Elkinsville Series

Taxonomic classification: Fine-silty, mixed, active, mesic Ultic Hapludalfs

Typical Pedon for the Series

Elkinsville silt loam, on a slope of 3 percent, in a cultivated field; 1,690 feet south and 1,370 feet east of the northwest corner of sec. 3, T. 6 N., R. 12 E.; Ripley County, Indiana.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.
Bt1—9 to 15 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; few fine roots; few faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; few patchy distinct brown (10YR 4/3) organic coatings on faces of peds; slightly acid; gradual smooth boundary.
Bt2—15 to 24 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; firm; many distinct discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.
2Bt3—24 to 38 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few fine roots; many distinct continuous brown (7.5YR 5/4) clay films on faces of peds; 1 percent pebbles; very strongly acid; gradual smooth boundary.
2Bt4—38 to 50 inches; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; firm; few fine roots; many distinct discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; 1 percent pebbles; very strongly acid; gradual smooth boundary.
2Bt5—50 to 58 inches; strong brown (7.5YR 5/6) sandy clay loam; few fine distinct pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few distinct discontinuous yellowish brown (10YR 5/4) clay bridging sand grains; common irregular fine and medium masses of iron accumulation in the matrix; very strongly acid; gradual smooth boundary.
2CB—58 to 68 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct pale brown (10YR 6/3) mottles; massive; friable; common irregular fine and medium masses of iron accumulation in the matrix; 1 percent pebbles; strongly acid; clear smooth boundary.
2C—68 to 80 inches; dark yellowish brown (10YR 4/4) loam; massive; friable; 4 percent pebbles; moderately acid.

Series Range in Characteristics

Depth to the base of the argillic horizon: 42 to 72 inches

A or Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
Texture—silt loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8
Texture—silt loam or silty clay loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas in the upper part

2Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8
Texture—loam, clay loam, or sandy clay loam
Content of rock fragments—0 to 5 percent pebbles
pH range—4.5 to 5.5

2BC or 2CB horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8
Texture—loam, clay loam, sandy loam, fine sandy loam, or sandy clay loam
Content of rock fragments—0 to 5 percent pebbles
pH range—4.5 to 5.5

2C horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6
Texture—loam, sandy loam, or fine sandy loam; includes thin strata of clay loam or sandy clay loam
Content of rock fragments—0 to 14 percent pebbles
pH range—4.5 to 6.0

Gatchel Series

Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Dystric Fluventic Eutrudepts

Typical Pedon for the Series

Gatchel loam, in a nearly level wooded area; 1,320 feet east and 3,168 feet south of the northwest corner of sec. 6, T. 4 S., R. 1 E.; Perry County, Indiana (fig. 14).

A—0 to 4 inches; dark brown (10YR 3/3) loam, brown (10YR 4/3) rubbed, pale brown (10YR 6/3) dry; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; moderately acid; clear wavy boundary.

Bw1—4 to 9 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; common fine roots; slightly acid; clear wavy boundary.

Bw2—9 to 14 inches; brown (10YR 4/3) fine sandy loam; weak fine and medium subangular blocky structure; friable; common fine roots; slightly acid; clear wavy boundary.

Bw3—14 to 18 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable; common fine roots; 2 percent pebbles; slightly acid; clear wavy boundary.

2C1—18 to 38 inches, yellowish brown (10YR 5/4) extremely channery coarse sandy loam; massive; very friable; 80 percent siltstone and sandstone channers and pebbles; slightly acid; clear wavy boundary.

2C2—38 to 60 inches; yellowish brown (10YR 5/4) extremely channery sandy loam; massive; very friable; 80 percent siltstone and sandstone channers and pebbles; slightly acid.

Series Range in Characteristics

Depth to the base of the cambic horizon: 12 to 30 inches

Depth to very channery or extremely channery material: 10 to 30 inches

A or Ap horizon:
- Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4 (A); hue of 10YR, value of 4 or 5, and chroma of 3 or 4 (Ap)
- Texture—loam
- Content of rock fragments—0 to 10 percent
- pH range—5.6 to 7.3

Bw horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
- Texture—loam, fine sandy loam, or sandy loam
- Content of rock fragments—0 to 10 percent
- pH range—5.6 to 7.3

Figure 14.—Typical pedon of Gatchel soil in a map unit of Gatchel loam, 0 to 2 percent slopes, occasionally flooded, very brief duration.

2C horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
- Texture—very channery or extremely channery analogs of loam, fine sandy loam, or coarse sandy loam
- Content of rock fragments—35 to 80 percent
- pH range—5.6 to 7.3

Ginat Series

Taxonomic classification: Fine-silty, mixed, active, mesic Typic Endoaqualfs

Typical Pedon for the Series

Ginat silt loam, in a nearly level area in a cultivated field; 900 feet west and 2,400 feet north of the

southeast corner of sec. 8, T. 7 S., R. 6 W.; Spencer County, Indiana.

Ap—0 to 9 inches; brown (10YR 5/3) silt loam, light gray (10YR 7/2) dry; moderate fine granular structure; friable; common very fine and fine roots throughout; few fine prominent strong brown (7.5YR 5/8) masses of iron accumulation, and few fine faint light brownish gray (10YR 6/2) iron depletions throughout; moderately acid; abrupt smooth boundary.

Btg1—9 to 18 inches; light gray (10YR 7/2) silt loam; moderate fine subangular blocky structure; friable; common very fine and fine roots between peds; common distinct continuous light gray (10YR 7/1) clay films on faces of peds and in pores; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; few medium rounded black (10YR 2/1) iron and manganese concretions; very strongly acid; gradual smooth boundary.

Btg2—18 to 32 inches; light gray (10YR 7/2) silt loam; moderate medium subangular blocky structure; friable; common fine and very fine roots; common distinct continuous light gray (10YR 7/1) clay films on faces of peds; many coarse prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1) iron and manganese concretions; very strongly acid; gradual smooth boundary.

Btg3—32 to 38 inches; light brownish gray (2.5Y 6/2) silt loam; weak fine prismatic structure parting to moderate medium subangular blocky; friable; common fine roots between peds; many distinct continuous gray (10YR 5/1) clay films on faces of peds; many medium prominent dark yellowish brown (10YR 4/6) masses of iron accumulation in the matrix; few medium rounded black (10YR 2/1) of iron and manganese concretions; strongly acid; gradual smooth boundary.

Btg4—38 to 46 inches; gray (10YR 6/1) silt loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common fine roots between peds; common distinct continuous gray (10YR 6/1) clay films of faces of peds and in pores; many medium prominent dark yellowish brown (10YR 4/6) masses of iron accumulation in the matrix; common distinct continuous white (10YR 8/1) clay depletions on vertical faces of peds; few fine and medium black (10YR 2/1) iron and manganese concretions; neutral; gradual smooth boundary.

Btg5—46 to 56 inches; gray (10YR 6/1) silty clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common fine roots between peds; common distinct continuous gray (10YR 5/1 and 6/1) clay films on faces of peds; common medium prominent dark yellowish brown (10YR 4/4) masses of iron accumulation in the matrix; common prominent continuous white (10YR 8/1) clay depletions on vertical faces of peds; few rounded black (10YR 2/1) iron and manganese concretions; slightly alkaline; clear smooth boundary.

Btg6—56 to 80 inches; gray (5Y 6/1) silty clay loam; moderate medium subangular blocky structure; firm; common prominent continuous gray (5Y 6/1) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; few fine and medium rounded black (10YR 2/1) iron and manganese concretions; slightly alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon: 60 to more than 80 inches

A or Ap horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 1 to 3
- Texture—silt loam
- pH range—4.5 to 6.0 in nonlimed areas; ranges to 7.3 in limed areas

Btg horizon (above a depth of 36 inches) and BE horizon:
- Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2; redoximorphic features present
- Texture—silt loam or silty clay loam
- pH range—4.5 to 6.0

Btg horizon (below a depth of 36 inches) or BCg horizon:
- Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2
- Texture—silt loam or silty clay loam; less commonly silty clay, clay loam, or loam
- pH range—5.1 to 7.8

Hartz Series

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

Typical Pedon for the Series

Hartz silt loam, in a nearly level area in a cultivated field; 1,250 feet north and 150 feet east of the southwest corner of sec. 32, T. 5 S., R. 3 W.; Perry County, Indiana.

Ap—0 to 9 inches; brown (10YR 5/3) silt loam, very

pale brown (10YR 7/3) dry; moderate medium granular structure; friable; common fine roots; very strongly acid; abrupt wavy boundary.

Bt1—9 to 17 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common fine roots between peds; many faint continuous light yellowish brown (10YR 6/4) and common faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; few medium faint pale brown (10YR 6/3) iron depletions in the matrix; very strongly acid; clear wavy boundary.

Bt2—17 to 29 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common fine roots between peds; many faint continuous yellowish brown (10YR 5/4) clay films on faces of peds; common medium distinct light gray (10YR 7/2) iron depletions in the matrix; very strongly acid; clear wavy boundary.

Btg—29 to 34 inches; light gray (10YR 7/2) silt loam; moderate medium subangular blocky structure; friable; common fine roots between peds; many faint continuous gray (10YR 6/1) clay films on faces of peds; many fine prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

B't1—34 to 39 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots between peds; many prominent continuous light brownish gray (10YR 6/2) clay films on faces of peds; many medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

B't2—39 to 48 inches; strong brown (7.5YR 5/6) silt loam; weak coarse prismatic structure parting to moderate fine subangular blocky; friable; common prominent discontinuous gray (10YR 6/1) clay films on faces of peds; common medium prominent light gray (10YR 7/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; moderately acid; clear wavy boundary.

B't3—48 to 65 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common prominent discontinuous light brownish gray (10YR 6/2) and few faint patchy yellowish brown (10YR 5/4) clay films on faces of peds; common fine prominent light brownish gray (10YR 6/2) iron depletions and common fine faint strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; neutral; clear wavy boundary.

2B't4—65 to 75 inches; stratified, 65 percent dark yellowish brown (10YR 4/4) silty clay loam and 35 percent silt loam; moderate fine subangular blocky structure; firm; common discontinuous prominent light brownish gray (10YR 6/2) clay films on faces of peds; common fine prominent light brownish gray (10YR 6/2) iron depletions and common fine faint yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; neutral; clear wavy boundary.

2Btk—75 to 80 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; common discontinuous prominent light brownish gray (10YR 6/2) and common discontinuous faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent light brownish gray (10YR 6/2) iron depletions and many medium faint yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions and few fine and medium irregular carbonate nodules; slightly effervescent; moderately alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon and to carbonates: 60 to 80 inches or more

Ap horizon:

- Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
- Texture—silt loam
- pH range—4.5 to 6.0 in nonlimed areas; ranges to 7.3 in limed areas

Bt or Btg horizon:

- Color—hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 2 to 6; redoximorphic features present
- Texture—silt loam or silty clay loam
- pH range—4.5 to 5.5

2Bt horizon:

- Color—hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 4 to 6; redoximorphic depletions present
- Texture—silty clay loam or silty clay; includes strata of silt loam
- pH range—4.5 to 7.3

2Btk horizon:

- Color—10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 6; redoximorphic depletions present

Texture—silty clay loam or silty clay; includes strata of silt loam
pH range—7.4 to 8.4

Hatfield Series

Taxonomic classification: Fine-silty, mixed, active, mesic Aeric Fragic Epiaqualfs

Typical Pedon for the Series

Hatfield silt loam, on a slope of 1 percent, in a pasture field; 800 feet north and 800 feet east of the southwest corner of sec. 20, T. 6 S., R. 3 W.; Perry County, Indiana.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; many fine and medium roots throughout; 3 percent rounded quartzite and subrounded sandstone fine pebbles; neutral; abrupt smooth boundary.

Bt—7 to 14 inches; light yellowish brown (10YR 6/4) silt loam; moderate fine subangular blocky structure; friable; many distinct continuous light gray (10YR 7/1) clay films on faces of peds and in pores; common medium distinct light gray (10YR 7/2) iron depletions, and common fine distinct yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; many fine irregular black (10YR 2/1) iron and manganese oxide concretions; 5 percent rounded quartzite and subrounded sandstone fine pebbles; moderately acid; clear smooth boundary.

Btg1—14 to 20 inches; light gray (10YR 7/2) silt loam; moderate fine subangular blocky structure; friable; many faint continuous light gray (10YR 7/1) clay films on faces of peds; common medium faint light gray (10YR 7/2) iron depletions and common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; many fine irregular black (10YR 2/1) iron and manganese oxide concretions; 3 percent rounded quartzite fine pebbles; very strongly acid; gradual smooth boundary.

Btg2—20 to 27 inches; light gray (10YR 7/2) silty clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common fine roots between peds; many faint continuous light gray (10YR 7/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; many fine irregular black (10YR 2/1) iron and manganese oxide concretions; 3 percent rounded quartzite fine pebbles; very strongly acid; gradual smooth boundary.

Btg3—27 to 36 inches; 85 percent light brownish gray (10YR 6/2) and 15 percent dark yellowish brown (10YR 4/6) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots between peds; many faint continuous light gray (10YR 7/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; many fine irregular black (10YR 2/1) iron and manganese oxide concretions; 1 percent rounded quartzite pebbles; very strongly acid; gradual wavy boundary.

Btg/Btx—36 to 44 inches; 60 percent light brownish gray (10YR 6/2) silty clay loam (Btg); moderate medium subangular blocky structure; firm; many faint continuous light gray (10YR 7/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; many fine irregular black (10YR 2/1) iron and manganese oxide concretions; 40 percent dark yellowish brown (10YR 4/6) silt loam (Btx); weak medium prismatic structure parting to moderate medium subangular blocky; very firm; few distinct discontinuous light gray (10YR 7/1) clay films of vertical faces of peds; brittle; strongly acid; gradual wavy boundary.

Btx1—44 to 55 inches; dark yellowish brown (10YR 4/6) silty clay loam; weak very coarse prismatic structure parting to moderate medium subangular blocky; very firm; few distinct patchy light brownish gray (10YR 6/2) clay films on vertical faces of peds; common medium distinct light brownish gray (10YR 6/2) clay depletions in the matrix; many fine irregular black (10YR 2/1) iron and manganese oxide concretions; 65 percent brittle; strongly acid; gradual smooth boundary.

Btx2—55 to 78 inches; dark yellowish brown (10YR 4/6) silty clay loam; weak very coarse prismatic structure parting to moderate medium subangular blocky; very firm; few distinct patchy light brownish gray (10YR 6/2) clay films on vertical faces of peds; common medium distinct light brownish gray (10YR 6/2) clay depletions in the matrix; many fine irregular black (10YR 2/1) iron and manganese oxide concretions; 65 percent brittle; moderately acid; gradual smooth boundary.

BCt—78 to 83 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very coarse platy structure parting to moderate fine subangular blocky; firm; very few distinct patchy yellowish brown (10YR 5/4) clay films on faces of peds; common irregular

black (10YR 2/1) iron and manganese oxide concretions; neutral.

Series Range in Characteristics

Depth to the base of the argillic horizon: 60 to more than 80 inches
Depth to a layer with fragic soil properties: 30 to 45 inches
Content of rock fragments: 0 to 5 percent pebbles throughout

A or Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
Texture—silt loam or silty clay loam
pH range—4.5 to 6.0 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 6; redoximorphic depletions present
Texture—silt loam or silty clay loam
pH range—4.5 to 6.0

Btg horizon:
Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2; redoximorphic features present
Texture—silt loam or silty clay loam
pH range—4.5 to 5.5

Btg/Btx or Btx horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6; redoximorphic features present
Texture—silt loam or silty clay loam; less commonly loam
pH range—4.5 to 5.5 in the upper part; ranges to 6.5 in the lower part

BCt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6; redoximorphic features present
Texture—silt loam, silty clay loam, loam, or clay loam or these stratified textures
pH range—5.6 to 7.8

Haymond Series

Taxonomic classification: Coarse-silty, mixed, superactive, mesic Dystric Fluventic Eutrudepts

Typical Pedon for the Series

Haymond silt loam, in a nearly level area in a cultivated field; 1,800 feet east and 300 feet north of the southwest corner of sec. 2, T. 1 S., R. 11 W.; Knox County, Indiana.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.
Bw1—10 to 25 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct continuous brown (10YR 4/3) organic coatings on faces of peds and in pores; slightly acid; clear smooth wavy boundary.
Bw2—25 to 44 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few distinct discontinuous dark yellowish brown (10YR 4/4) organic coatings on faces of peds; neutral; clear smooth boundary.
2C—44 to 60 inches; yellowish brown (10YR 5/4) fine sandy loam; massive with weak bedding planes; friable; slightly alkaline.

Series Range in Characteristics

Depth to the base of the cambic horizon: 30 to 50 inches

A or Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—silt loam
pH range—5.6 to 7.3; less commonly ranges to 7.8

Bw horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—silt loam
pH range—5.6 to 7.3; less commonly ranges to 7.8

C horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—silt loam, loam, sandy loam, or fine sandy loam
Content of rock fragments—0 to 5 percent pebbles
pH range—6.1 to 7.3; less commonly ranges to 7.8

Hosmer Series

Taxonomic classification: Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs

Typical Pedon for the Series

Hosmer silt loam, on a convex, west-facing slope of 4 percent, in a cultivated field; 1,340 feet east and 435 feet south of the northwest corner of donation 68, T. 3 N., R. 9 W.; Knox County, Indiana.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium granular

structure; friable; many fine roots; neutral; abrupt smooth boundary.
BE—6 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; common fine roots; moderately acid; clear smooth boundary.
Bt1—13 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; many distinct discontinuous brown (7.5YR 4/4) clay films on faces of peds; many distinct discontinuous pale brown (10YR 6/3) clay depletions on faces of peds; very strongly acid; clear smooth boundary.
Bt2—21 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; many distinct pale brown (10YR 6/3) and common light brownish gray (10YR 6/2) clay depletions on vertical faces of peds; few black (10YR 2/1) iron and manganese stains on faces of peds; very strongly acid; clear wavy boundary.
Btx/E—28 to 30 inches; yellowish brown (10YR 5/6) silt loam (Btx); weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many fine vesicular pores; many distinct light brownish gray (10YR 6/2) and prominent light gray (10YR 7/1) clay depletions on faces of peds and filling voids (E—10 to 15 percent, by volume); very strongly acid; abrupt irregular boundary.
Btx1—30 to 45 inches; yellowish brown (10YR 5/6) silt loam; strong very coarse prismatic structure; very firm; few fine flattened roots between peds; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; many distinct continuous light brownish gray (10YR 6/2) clay depletions in pores and on faces of peds; brittle; very strongly acid; gradual wavy boundary.
Btx2—45 to 64 inches; yellowish brown (10YR 5/6) silt loam; strong very coarse prismatic structure; very firm; many fine vesicular pores; few distinct discontinuous brown (7.5YR 4/4) clay films on faces of peds; common distinct continuous light brownish gray (10YR 6/2) clay depletions on faces of peds; brittle; very strongly acid; gradual irregular boundary.
2B't—64 to 80 inches; yellowish brown (10YR 5/4) silt loam; weak very coarse prismatic structure; friable; few distinct discontinuous gray (10YR 5/1) clay films on faces of peds; common distinct light brownish gray (10YR 6/2) clay depletions on faces of peds; 15 percent fine and medium sand; strongly acid.

Series Range in Characteristics

Depth to the base of the argillic horizon: 50 to more than 80 inches
Depth to a fragipan: 20 to 36 inches

A or Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
Texture—silt loam
pH range—5.1 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt or BE horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6
Texture—silt loam or silty clay loam
pH range—4.5 to 6.0

Btx part of Btx/E horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8; redoximorphic depletions present
Texture—silt loam
pH range—4.5 to 6.0

2Bt horizon and B't or BC horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8
Texture—silt loam or silty clay loam
pH range—4.5 to 6.0

Huntington Series

Taxonomic classification: Fine-silty, mixed, active, mesic Fluventic Hapludolls

Typical Pedon for the MLRA

Huntington silty clay loam, in a nearly level area in a cultivated field; 585 feet east and 415 feet south of the northwest corner of sec. 20, T. 5 S., R. 1 E.; Perry County, Indiana.

Ap—0 to 6 inches; dark brown (10YR 3/3) rubbed, silty clay loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; friable; many fine roots; slightly acid; abrupt smooth boundary.
A—6 to 12 inches; dark brown (10YR 3/3) rubbed, silty clay loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; many fine roots; neutral; clear wavy boundary.
BA—12 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure

parting to moderate medium subangular blocky; friable; many fine roots; many distinct continuous dark brown (10YR 3/3) organic coatings on faces of peds; neutral; clear wavy boundary.

Bw1—25 to 41 inches; brown (7.5YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; many distinct continuous brown (10YR 5/3) clay depletions on faces of peds; neutral; clear wavy boundary.

Bw2—41 to 50 inches; brown (7.5YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; common distinct discontinuous brown (10YR 5/3) clay depletions on faces of peds; neutral; clear wavy boundary.

Bw3—50 to 62 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable; common distinct patchy brown (10YR 5/3) clay depletions on faces of peds; common fine iron and manganese concretions; slightly acid; clear wavy boundary.

Bw4—62 to 78 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak coarse prismatic structure parting to moderate fine subangular blocky; friable; common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine iron and manganese concretions; moderately acid; clear wavy boundary.

BC—78 to 90 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse prismatic structure parting to weak fine subangular blocky; friable; few fine prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine iron and manganese concretions; moderately acid.

MLRA Range in Characteristics

Depth to the base of the cambic horizon: 40 to 70 or more inches

Thickness of the mollic epipedon: 10 to 14 inches; ranges to 24 inches

pH range: 5.6 to 7.8 throughout

A or Ap horizon:
- Color—hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 2 or 3
- Texture—silty clay loam

Bw or BA horizon:
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4
- Texture—silt loam or silty clay loam

BC horizon:
- Color—hue 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4
- Texture—loam or silty clay loam; less commonly loam, sandy loam, or sandy clay loam

Johnsburg Series

Taxonomic classification: Fine-silty, mixed, active, mesic Fragiaquic Hapludults

Taxadjunct features: The Johnsburg soils in this survey area do not have a subhorizon with a fragipan that has vertical streaks with a mean horizontal dimension of 4 inches or more. This difference, however, does not affect the usefulness or behavior of the soils.

Typical Pedon for Series

Johnsburg silt loam, in a nearly level area in a cultivated field; 780 feet north and 780 feet west of the center of sec. 36, T. 3 S., R. 1 E.; Crawford County, Indiana.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

EB—10 to 14 inches; light yellowish brown (2.5Y 6/4) silt loam; weak very thick platy structure parting to weak medium subangular blocky; friable; common fine distinct gray (10YR 6/1) iron depletions in the matrix; very strongly acid; clear smooth boundary.

Bt1—14 to 20 inches; pale brown (10YR 6/3) silt loam; moderate medium subangular blocky structure; friable; many distinct discontinuous light gray (10YR 7/2) clay depletions and few distinct discontinuous light brownish gray (10YR 6/2) clay films on faces of peds; common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation and common medium distinct gray (10YR 6/1) iron depletions in the matrix; very strongly acid; clear smooth boundary.

Bt2—20 to 24 inches; light yellowish brown (10YR 6/4) silt loam; moderate medium and fine prismatic structure parting to moderate medium and coarse subangular blocky; friable; common distinct discontinuous light gray (10YR 7/2) clay depletions and few faint discontinuous light brownish gray (10YR 6/2) clay films on faces of peds and in pores; many medium and coarse distinct light gray (10YR 7/2) iron depletions in the matrix; very strongly acid; clear smooth boundary.

Btg—24 to 36 inches; gray (10YR 6/1) silt loam; moderate medium prismatic structure; firm; common faint continuous gray (10YR 5/1) clay films on faces of peds and in pores; many prominent irregularly shaped yellowish brown (10YR 5/8) and dark yellowish brown (10YR 4/4) masses of iron accumulation in the matrix; common black (10YR 2/1) iron and manganese oxide concretions; 30 percent brittle; very strongly acid; gradual smooth boundary.

Btx1—36 to 50 inches; yellowish brown (10YR 5/4) silt loam; moderate very coarse prismatic structure; very firm; common continuous prominent gray (10YR 5/1) clay films on faces of peds; many prominent continuous gray (10YR 6/1) clay depletions on faces of peds; common distinct gray (10YR 6/1) iron depletions in the matrix; brittle; very strongly acid; gradual smooth boundary.

2Btx2—50 to 72 inches; brown (10YR 5/3) silt loam; moderate coarse and very coarse prismatic structure parting to weak thick platy; very firm; common continuous prominent gray (10YR 5/1) films on faces of peds; common prominent continuous gray (10YR 6/1) clay depletions on faces of peds; brittle; strongly acid; gradual smooth boundary.

2CB—72 to 90 inches; brown (10YR 5/3) silt loam; massive; firm; few medium distinct gray (10YR 6/1) iron depletions in the matrix; strongly acid; gradual smooth boundary.

2Cr—90 inches; moderately cemented siltstone.

Series Range in Characteristics

Depth to the base of the argillic horizon: 50 to 80 inches

Depth to paralithic contact: 60 to 100 inches

A or Ap horizon:
- Color—hue of 10YR, value of 4 to 6, and chroma of 2 or 3
- Texture—silt loam
- pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

BE, Bt, or Btg horizon:
- Color—hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 6; redoximorphic features present
- Texture—silt loam or silty clay loam
- pH range—3.5 to 5.5

Btx or 2Btx horizon:
- Color—hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 1 to 8; redoximorphic features present
- Texture—silt loam or silty clay loam; less commonly loam, clay loam, or sandy loam
- Content of rock fragments—0 to 5 percent channers
- pH range—3.5 to 5.5

2BC or 2CB horizon:
- Color—hue 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 6
- Texture—silt loam; less commonly loam, channery clay loam, or sandy loam
- Content of rock fragments—0 to 35 percent channers
- Content of pararock fragments—0 to 15 percent parachanners
- pH range—3.5 to 5.5

2Cr horizon (where present):
- Color—hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 6

Jubin Series

Taxonomic classification: Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Typical Pedon for the Series

Jubin very stony loam, on a slope of 40 percent, in a wooded area; 1,000 feet east and 2,750 feet south of the northwest corner of sec. 6, T. 4 S., R. 1 W.; Perry County, Indiana.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) very stony loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; many fine to coarse roots; 10 percent boulders; 20 percent stones; 10 percent flagstones; 10 percent channers (sandstone); strongly acid; clear wavy boundary.

BA—4 to 24 inches; dark yellowish brown (10YR 4/4) extremely flaggy loam; weak fine subangular blocky structure; friable; many fine to coarse roots; 15 percent boulders; 20 percent stones; 25 percent flagstones; 20 percent channers (sandstone); very strongly acid; gradual wavy boundary.

Bw1—24 to 38 inches; yellowish brown (10YR 5/4) extremely bouldery fine sandy loam; weak fine subangular blocky structure; friable; many fine and medium roots; 60 percent boulders; 10 percent stones; 10 percent channers (sandstone); very strongly acid; gradual wavy boundary.

Bw2—38 to 48 inches; yellowish brown (10YR 5/4) extremely bouldery fine sandy loam; moderate fine and medium subangular blocky structure; friable; common fine roots; 60 percent boulders; 10 percent flagstones (sandstone); very strongly acid; gradual wavy boundary.

Bw3—48 to 60 inches; yellowish brown (10YR 5/4) extremely flaggy fine sandy loam; moderate fine

and medium subangular blocky structure; friable; few fine roots; 60 percent flagstones; 10 percent channers (sandstone); very strongly acid; gradual wavy boundary.

Bw4—60 to 80 inches; brown (10YR 5/3) extremely flaggy fine sandy loam; moderate fine and medium subangular blocky structure; friable; few fine roots; 60 percent flagstones; 10 percent channers (sandstone); very strongly acid.

Series Range in Characteristics

Depth to bedrock and base of the cambic horizon: More than 80 inches

A horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 3
- Texture—very stony loam
- Content of rock fragments—35 to 60 percent stones, boulders, channers, and flagstones
- pH range—5.1 to 6.5

BA horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
- Texture—loam or fine sandy loam in the fine-earth section
- Content of rock fragments—35 to 90 percent channers, flagstones, stones, and boulders
- pH range—4.5 to 6.0

Bw horizon and BC horizon (where present):
- Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
- Texture—loam or fine sandy loam in the fine-earth section
- Content of rock fragments—35 to 90 percent stones, boulders, channers, and flagstones
- pH range—4.5 to 6.0

Kitterman Series

Taxonomic classification: Very fine, mixed, active, mesic Aquic Hapludalfs

Typical Pedon for the Series

Kitterman channery silty clay loam, on a convex, south-facing slope of 15 percent, in a wooded area; 1,500 feet east and 1,150 feet north of the southwest corner of sec. 32, T. 5 S., R. 1 W.; Perry County, Indiana.

A—0 to 2 inches; dark grayish brown (10YR 4/2) channery silty clay loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many fine roots; many medium faint brown (10YR 5/3) masses of iron accumulation throughout; 25 percent sandstone channers; very strongly acid; abrupt smooth boundary.

Bt1—2 to 10 inches; yellowish red (5YR 5/6) clay; strong fine and medium subangular blocky structure; firm; many fine and medium roots between peds; common distinct continuous yellowish red (5YR 5/6) clay films on faces of peds; common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; very strongly acid; clear wavy boundary.

Bt2—10 to 13 inches; yellowish red (5YR 5/6) clay; strong medium subangular blocky structure; firm; many fine and medium roots between peds; many distinct continuous yellowish red (5YR 5/6) clay films on faces of peds; common medium prominent light gray (10YR 7/1) iron depletions in the matrix; very strongly acid; clear smooth boundary.

Bt3—13 to 22 inches; yellowish brown (10YR 5/4) clay; moderate medium subangular blocky structure; firm; many fine roots between peds; many distinct continuous yellowish brown (10YR 5/4) clay films on faces of peds; common medium prominent light gray (10YR 7/1) iron depletions and many strong brown (7.5YR 5/8) masses of iron accumulation in the matrix and pore linings; very strongly acid; abrupt wavy boundary.

BCtg—22 to 27 inches; gray (10YR 5/1) extremely parachannery clay; moderate thick platy structure; firm; common fine roots; common faint discontinuous gray (10YR 5/1) clay films on faces of peds; common medium prominent brownish yellow (10YR 6/6) masses of iron accumulation in the matrix; 80 percent weakly cemented parachanners (shale); moderately acid; abrupt wavy boundary.

Cr—27 to 60 inches; weakly cemented shale interbedded with thin layers of strongly cemented sandstone.

Series Range in Characteristics

Depth to the base of the argillic horizon and a paralithic contact: 20 to 40 inches

Thickness of the loess: 0 to 10 inches

Content of rock fragments in the control section: 0 to 25 percent throughout

A horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
- Texture—channery silty clay loam
- pH range—3.5 to 6.0

Bt horizon:
Color—hue of 5YR, 7.5YR, 10YR, or 2.5Y; value of 4 to 6; and chroma of 4 to 6; redoximorphic depletions present
Texture—dominantly clay or channery clay; includes thin horizons of silty clay loam or silty clay in the upper part
pH range—4.5 to 5.5

BC or BCtg horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value of 4 to 6; and chroma of 1 to 6; redoximorphic features present
Texture—clay or silty clay or the channery and parachannery to extremely parachannery analogs of these textures
Content of rock fragments—0 to 25 percent
pH range—4.5 to 7.3

Cr horizon:
Texture—weakly cemented shale that is commonly interbedded with thin layers of strongly or more cemented sandstone

Lauer Series

Taxonomic classification: Fine-silty, mixed, active, mesic Aeric Epiaqualfs

Typical Pedon for the Series

Lauer silt loam, in a nearly level area in a cultivated field; 75 feet east and 2,540 feet south of the northwest corner of sec. 32, T. 5 S., R. 3 W.; Perry County, Indiana.

Ap—0 to 8 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate fine granular structure; friable; common fine roots; very strongly acid; abrupt smooth boundary.

Bt1—8 to 13 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots between peds; many distinct discontinuous gray (10YR 6/1) clay films and few distinct discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; common medium distinct light brownish gray (10YR 6/2) iron depletions and common fine distinct pale brown (10YR 6/3) masses of iron accumulation in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

Bt2—13 to 23 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots between peds; common distinct continuous light brownish gray (10YR 6/2) clay films and few faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; many medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

Bt3—23 to 34 inches; yellowish brown (10YR 5/6) silty clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; friable; common fine roots between peds; many distinct continuous gray (10YR 6/1) clay films on faces of peds; many fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

Bt4—34 to 44 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; many distinct discontinuous light brownish gray (10YR 6/2) clay films on faces of peds; many fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; strongly acid; clear wavy boundary.

Bt5—44 to 54 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many distinct discontinuous light brownish gray (10YR 6/2) clay films on faces of peds; many fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; slightly acid; clear wavy boundary.

2Bt6—54 to 63 inches; strong brown (7.5YR 5/6) silty clay; moderate coarse subangular blocky structure; firm; many prominent discontinuous light brownish gray (10YR 6/2) clay films on faces of peds; many fine prominent light brownish gray (10YR 6/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; slightly alkaline; clear wavy boundary.

2Btk1—63 to 73 inches; yellowish brown (10YR 5/6) silty clay loam with a strata 1/4 inch to 2 inches thick of silt loam at the bottom of the horizon; moderate coarse subangular blocky structure; firm; many prominent discontinuous light brownish gray (10YR 6/2) clay films on faces of peds; many fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few medium irregular carbonate nodules throughout; strongly effervescent throughout; moderately alkaline; clear wavy boundary.

2Btk2—73 to 80 inches; yellowish brown (10YR 5/6) stratified silty clay, silty clay loam, and silt loam; moderate coarse subangular blocky structure; firm;

many prominent discontinuous light brownish gray (10YR 6/2) clay films on faces of peds; many fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common medium irregular carbonate nodules throughout; strongly effervescent throughout; moderately alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon: 60 to more than 80 inches

A or Ap horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
- Texture—silt loam
- pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon:
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6; redoximorphic depletions present
- Texture—silt loam or silty clay loam
- pH range—4.5 to 5.5

2Bt horizon:
- Color—hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 2 to 6; redoximorphic features present
- Texture—silty clay loam or silty clay; includes strata of silt loam
- pH range—5.6 to 7.8

2Btk horizon and 2BC horizon (where present):
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6; redoximorphic features present
- Texture—stratified silt loam, silty clay loam, or silty clay
- pH range—7.4 to 8.4

Markland Series

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

Typical Pedon for the Series

Markland silt loam, on a slope of 46 percent, in a wooded area; 1,200 feet east and 1,650 feet south of the northwest corner of sec. 22, T. 5 S., R. 1 W.; Perry County, Indiana.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate fine and medium subangular blocky structure; friable; many fine and medium roots; slightly acid; clear wavy boundary.

2Bt1—4 to 15 inches; yellowish brown (10YR 5/6) silty clay; strong medium angular blocky structure; firm; common fine and medium roots between peds; common distinct continuous yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid; clear wavy boundary.

2Bt2—15 to 28 inches; yellowish brown (10YR 5/6) silty clay; strong medium angular blocky structure; firm; common fine and medium roots between peds; common distinct continuous yellowish brown (10YR 5/4) clay films on faces of peds; neutral; clear smooth boundary.

2Btk1—28 to 38 inches; yellowish brown (10YR 5/6) silty clay; strong fine subangular blocky structure; firm; few fine roots between peds; common distinct continuous brown (10YR 5/3) clay films on faces of peds; few fine calcium carbonate nodules; strongly effervescent; moderately alkaline; clear wavy boundary.

2Btk2—38 to 48 inches; yellowish brown (10YR 5/6) silty clay loam; strong fine subangular blocky structure; firm; few fine roots between peds; common distinct continuous brown (10YR 5/3) clay films on faces of peds; many fine and medium calcium carbonate nodules; strongly effervescent; moderately alkaline; clear wavy boundary.

2Btk3—48 to 59 inches; yellowish brown (10YR 5/6) silty clay loam; strong fine subangular blocky structure; firm; few fine roots between peds; common distinct continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; many fine and medium calcium carbonate nodules; strongly effervescent; moderately alkaline; clear wavy boundary.

2BCtk—59 to 80 inches; 90 percent yellowish brown (10YR 5/6) silty clay loam and 10 percent yellowish brown (10YR 5/6) silty clay; weak fine subangular blocky structure; friable; few fine roots between peds; few distinct patchy dark yellowish brown (10YR 4/4) clay films on faces of peds; many fine calcium carbonate nodules; strongly effervescent; moderately alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon: 30 to 70 inches

Depth to carbonates: 20 to 40 inches; severely eroded areas can be less than 20 inches

A or Ap horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 3 (A); hue of 10YR, value of 4 or 5, and chroma of 2 to 4 (Ap)
- Texture—silt loam or silty clay loam
- pH range—5.1 to 7.3

2Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6
Texture—silty clay loam or silty clay
pH range—4.5 to 7.8

2Btk horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6
Texture—silty clay loam or silty clay
pH range—7.4 to 8.4

2BCtk horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 to 6
Texture—silty clay loam or silty clay; includes silt loam or silt
pH range—7.4 to 8.4

McAdoo Series

Taxonomic classification: Fine-silty, mixed, active, mesic Fluventic Eutrudepts
Taxadjunct features: The McAdoo soils in this survey area have a lower cation-exchange capacity than is typical for the series. This difference, however, does not affect the usefulness or behavior of the soils.

Typical Pedon for the Series

McAdoo silty clay loam, in a nearly level area in a cultivated field; 2,304 feet north and 164 feet west of the southeast corner of sec. 29, T. 6 S., R. 14 W.; Posey County, Indiana.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silty clay loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; many fine roots; neutral; clear smooth boundary.
Bw1—10 to 28 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; firm; common fine roots; common distinct continuous dark grayish brown (10YR 4/2) organic coatings on faces of peds; neutral; gradual smooth boundary.
Bw2—28 to 48 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; firm; many distinct continuous dark grayish brown (10YR 4/2) organic coatings on faces of peds; very slightly effervescent; slightly alkaline; gradual smooth boundary.
C1—48 to 55 inches; brown (10YR 4/3) silt loam; massive; very friable; few fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.
C2—55 to 60 inches; brown (10YR 5/3) silt loam with thin strata of light yellowish brown (10YR 6/4) loam; massive; very friable; few fine roots; slightly effervescent; moderately alkaline.

Series Range in Characteristics

Depth to the base of the cambic horizon: 32 to 54 inches
Carbonates present: In at least one subhorizon above a depth of 40 inches

A or Ap horizon:
Color—hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3
Texture—silty clay loam
pH range—6.6 to 7.8

Bw horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value of 4 or 5; and chroma of 3 to 6
Texture—silt loam or silty clay loam
pH range—6.6 to 7.8

C horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value of 4 or 5; and chroma of 3 to 6
Texture—silt loam, silty clay loam, or loam
pH range—6.6 to 8.4

McGary Series

Taxonomic classification: Fine, mixed, active, mesic Aeric Epiaqualfs

Typical Pedon for the Series

McGary silt loam, in a nearly level area in a cultivated field; 2,050 feet east and 700 feet north of the southwest corner of sec. 24, T. 6 N., R. 7 W.; Greene County, Indiana.

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; weak coarse subangular blocky structure parting to moderate fine and medium granular; friable; neutral; abrupt smooth boundary.
2Bt—11 to 15 inches; brown (10YR 5/3) silty clay; moderate medium subangular blocky structure; firm; many faint continuous grayish brown (10YR 5/2) clay films on faces of peds; common fine distinct gray (10YR 6/1) irregularly shaped iron depletions in the matrix; moderately acid; clear smooth boundary.
2Btg1—15 to 22 inches; grayish brown (10YR 5/2) silty clay; weak fine and medium prismatic structure parting to moderate medium angular blocky; firm; many distinct continuous gray (10YR 5/1) clay

films on faces of peds; common fine faint yellowish brown (10YR 5/4) irregularly shaped masses of iron accumulation in the matrix; few fine black (10YR 2/1) iron and manganese oxide concretions; neutral; clear smooth boundary.

2Btg2—22 to 27 inches; grayish brown (10YR 5/2) silty clay; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many distinct continuous gray (10YR 5/1) clay films on faces of peds; common fine faint yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; slightly effervescent in places; slightly alkaline; gradual irregular boundary.

2Btg3—27 to 42 inches; gray (10YR 5/1) silty clay; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct discontinuous gray (10YR 6/1) clay films on faces of peds; common fine distinct light yellowish brown (10YR 6/4) masses of iron accumulation in the matrix; few fine and medium weakly cemented calcium carbonate nodules; slightly effervescent; slightly alkaline; clear irregular boundary.

2BCtgk—42 to 50 inches; gray (10YR 6/1) silty clay; weak coarse angular blocky structure; firm; few faint discontinuous gray (10YR 5/1) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium weakly cemented calcium carbonate nodules; strongly effervescent; moderately alkaline; gradual wavy boundary.

2Cg—50 to 60 inches; gray (10YR 6/1) stratified silty clay loam and silty clay; massive; firm; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium weakly cemented calcium carbonate nodules; strongly effervescent; moderately alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon: 38 to 50 inches

Depth to carbonates: 22 to 56 inches

A or Ap horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 1 to 4
- Texture—silt loam
- pH range—5.6 to 7.3

2Bt or 2Btg horizon:
- Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6
- Texture—silty clay loam or silty clay
- pH range—4.5 to 7.3 in the upper part; 6.6 to 7.8 in the lower part

2BCtgk or 2BC horizon:
- Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6
- Texture—silty clay or silty clay loam
- pH range—6.6 to 8.4

2C or 2Cg horizon:
- Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6
- Texture—stratified silty clay or silty clay loam; includes thin strata of silt loam
- pH range—7.4 to 8.4

Millstone Series

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

Typical Pedon for the Series

Millstone loam, on a slope of 1 percent, in a cultivated field; 900 feet south and 760 feet west of the northeast corner of sec. 5, T. 8 S., R. 2 W.; Perry County, Indiana.

Ap—0 to 12 inches; brown (10YR 4/3) loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure; friable; common fine roots throughout; very strongly acid; abrupt smooth boundary.

Bt1—12 to 18 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine roots between peds; many distinct discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; 1 percent fine pebbles; very strongly acid; clear wavy boundary.

Bt2—18 to 27 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; common fine roots between peds; many distinct continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—27 to 43 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; many distinct continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt4—43 to 52 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; many distinct continuous distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt5—52 to 59 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; many distinct continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.
Bt6—59 to 65 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; many distinct continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; common prominent patchy light yellowish brown (10YR 6/4) silt coatings on faces of peds; very strongly acid; clear wavy boundary.
Bt7—65 to 74 inches; brown (7.5YR 4/4) very fine sandy loam; moderate fine subangular blocky structure; friable; very thin sand fillings in vertical cracks; common distinct patchy brown (7.5YR 4/4) clay films on faces of peds; few fine faint light yellowish brown (10YR 6/4) masses of iron accumulation in the matrix; very strongly acid; clear wavy boundary.
Bt8—74 to 80 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; few faint patchy brown (7.5YR 4/4) clay films on faces of peds; common fine prominent light gray (10YR 7/2) iron depletions in the matrix; few fine irregular black (10YR 2/1) iron and manganese concretions; very strongly acid.

Series Range in Characteristics

Depth to the base of the argillic horizon: 60 to more than 80 inches
Depth to the base of soil development: More than 80 inches

A or Ap horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4
Texture—loam
Content of rock fragments—0 to 5 percent pebbles
pH range—4.5 to 6.0 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon and BC horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6
Texture—loam, fine sandy loam, very fine sandy loam, clay loam, or sandy clay loam above a depth of 40 inches; includes the gravelly analogs of these textures below a depth of 40 inches
Content of rock fragments—0 to 14 percent above a depth of 40 inches; 0 to 35 percent below a depth of 40 inches
pH range—4.5 to 6.0

Newark Series

Taxonomic classification: Fine-silty, mixed, active, nonacid, mesic Fluventic Endoaquepts

Typical Pedon for Series

Newark silt loam, in a nearly level area of a cultivated field; 3 miles northwest of Owensboro, Kentucky, and 0.5 mile north of Hawes Park, Kentucky; 1,000 feet south of the railroad and 400 feet west of Willett Road; Daviess County, Kentucky.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; many roots; slightly acid; abrupt smooth boundary.
Bw—9 to 15 inches; brown (10YR 5/3) silt loam; weak fine granular structure; very friable; few roots; many fine and medium faint light brownish gray (10YR 6/2) iron depletions in the matrix; few flakes of mica; slightly acid; gradual smooth boundary.
Bg—15 to 32 inches; light brownish gray (2.5Y 6/2) silt loam; weak medium subangular blocky structure; very friable; few very fine roots between peds; many medium distinct brown (10YR 4/3) masses of iron accumulation in the matrix; few flakes of mica; slightly acid; gradual smooth boundary.
Cg—32 to 52 inches; light brownish gray (2.5Y 6/2) silt loam; massive; very friable; common medium faint light gray (10YR 7/2) iron depletions in the matrix; common medium distinct brown (10YR 5/3) and common coarse prominent yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; few weakly cemented, fine, irregularly shaped black and brown iron and manganese concretions; few flakes of mica; slightly acid; gradual smooth boundary.
C—52 to 60 inches; brown (10YR 4/3) silt loam; massive; very friable; many medium distinct gray (10YR 6/1) iron depletions in the matrix; few weakly cemented irregularly shaped black and brown iron and manganese concretions; few flakes of mica; slightly acid.

Series Range in Characteristics

Depth to the base of the cambic horizon: 20 to 50 inches
pH range in the control section: 5.6 to 7.8 throughout

A or Ap horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value of 4 or 5; and chroma of 2 to 4
Texture—silt loam or silty clay loam

Bw horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value of 4 or 5; and chroma of 2 to 4; redoximorphic features present
Texture—silt loam or silty clay loam

Bg or BCg horizon:
Color—hue of 7.5YR, 10YR, 2.5Y, or N; value of 4 to 7; and chroma of 0 to 2; redoximorphic features present
Texture—silt loam or silty clay loam

Cg or C horizon:
Color—hue of 7.5YR, 10YR, 2.5Y, or N; value of 4 to 7; and chroma of 0 to 4; redoximorphic features present
Texture—silt loam or silty clay loam; includes thin layers of loam and fine sandy loam below a depth of 40 inches

Percell Series

Taxonomic classification: Fine-silty, mixed, active, mesic Oxyaquic Hapludalfs

Typical Pedon for the Series

Percell silt loam, on a slope of 3 percent, in a cultivated field; 2,300 feet west and 2,600 feet north of the southeast corner of sec. 31, T. 5 S., R. 3 W.; Perry County, Indiana.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots throughout; slightly acid; abrupt smooth boundary.
Bt1—8 to 12 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots between peds; common distinct continuous brown (10YR 4/3) organic coatings on faces of peds; common continuous faint yellowish brown (10YR 5/4) clay films on faces of peds; neutral; clear wavy boundary.
Bt2—12 to 22 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots between peds; many faint continuous yellowish brown (10YR 5/4) clay films on faces of peds; moderately acid; clear wavy boundary.
Bt3—22 to 30 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots between peds; many faint continuous brown (7.5YR 5/4) clay films on faces of peds; common prominent discontinuous light yellowish brown (10YR 6/4) silt coatings on faces of peds; strongly acid; clear wavy boundary.
Bt4—30 to 49 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots between peds; many prominent continuous brown (7.5YR 4/4) clay films on faces of peds; many coarse prominent light gray (10YR 7/2) iron depletions in the matrix; few irregular black (10YR 2/1) iron and manganese concretions; strongly acid; clear wavy boundary.
Bt5—49 to 60 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots between peds; few prominent patchy light brownish gray (10YR 6/2) clay films on faces of peds; many fine prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common irregular black (10YR 2/1) iron and manganese concretions; slightly acid; clear wavy boundary.
2Bt6—60 to 70 inches; brown (10YR 5/3) silty clay; weak medium prismatic structure parting to strong medium angular blocky; firm; common distinct patchy light brownish gray (10YR 6/2) clay films on faces of peds; few fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; neutral; clear wavy boundary.
2Btk—70 to 80 inches; brown (10YR 5/3) silty clay; weak medium prismatic structure parting to strong medium angular blocky; firm; common distinct patchy light brownish gray (10YR 6/2) clay films on faces of peds; few fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common irregular carbonate nodules; strongly effervescent; moderately alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon and to carbonates: 60 to more than 80 inches

Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 or 3
Texture—silt loam
pH range—4.5 to 6.0 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 6
Texture—silt loam or silty clay loam
pH range—4.5 to 6.0; ranges to 7.3 in limed areas in the upper part

2Bt horizon:
Color—hue of 10YR, value of 4 to 6, and chroma of 3 to 6; redoximorphic depletions present

Texture—silty clay loam or silty clay; includes strata of silt loam
pH range—5.6 to 7.3

2Btk horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 3 to 6; redoximorphic depletions present
Texture—stratified silt loam, silty clay loam, or silty clay
pH range—7.4 to 8.4

Petrolia Series

Taxonomic classification: Fine-silty, mixed, superactive, nonacid, mesic Fluvaquentic Endoaquepts

Typical Pedon for the Series

Petrolia silty clay loam, in a nearly level area in a cultivated field; 1,240 feet east and 705 feet north of the southwest corner of sec. 6, T. 4 S., R. 8 E.; White County, Illinois.

Ap—0 to 8 inches; dark gray (10YR 4/1) silty clay loam, gray (10YR 6/1) dry; weak fine and medium granular structure; friable; many fine roots; few very fine black (10YR 2/1) concretions (iron and manganese oxides); moderately acid; abrupt smooth boundary.

Cg1—8 to 30 inches; gray (10YR 5/1) silty clay loam; weak medium and coarse subangular blocky structure; firm; few fine roots; dark gray (10YR 4/1) linings in root channels; common medium distinct dark yellowish brown (10YR 4/4) and common fine distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; few fine black (10YR 2/1) concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Cg2—30 to 58 inches; gray (10YR 5/1) silty clay loam; weak medium and coarse angular blocky structure; very firm; few fine roots; common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation the matrix; few fine black (10YR 2/1) concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Cg3—58 to 70 inches; gray (10YR 6/1) silty clay loam; massive; firm; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1) concretions (iron and manganese oxides); slightly alkaline.

Series Range in Characteristics

A or Ap horizon:
Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2 (A); hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2 (Ap)
Texture—silty clay loam
pH range—5.6 to 7.3

Cg horizon:
Color—hue of 2.5Y, 10YR, 5Y, or N; value of 4 to 6; and chroma of 0 to 2; redoximorphic features present
Texture—silty clay loam; includes silt loam below a depth of 40 inches
pH range—6.1 to 7.3 above a depth of 40 inches; 6.1 to 7.8 below a depth of 40 inches

Princeton Series

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

Typical Pedon for the Series

Princeton fine sandy loam, on a slope of 4 percent, in an cultivated field; 2,380 feet west and 360 feet south of the northeast corner of sec. 5, T. 10 S., R. 9 W.; Vigo County, Indiana.

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many medium roots; neutral; abrupt smooth boundary.

Bt1—8 to 11 inches; strong brown (7.5YR 5/6) loam; weak thick platy structure parting to weak fine and very fine subangular blocky; friable; common medium roots; common distinct continuous very pale brown (10YR 7/3) silt coatings on faces of peds; few distinct discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear wavy boundary.

Bt2—11 to 26 inches; brown (7.5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; firm; common medium and fine roots; many distinct continuous reddish brown (5YR 4/4) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—26 to 41 inches; yellowish red (5YR 5/6) fine sandy loam; weak coarse subangular blocky structure; friable; few fine roots; common distinct discontinuous reddish brown (5YR 4/4) clay films on faces of peds; moderately acid; gradual wavy boundary.

E and Bt—41 to 60 inches; brown (7.5YR 4/4) loamy fine sand (E); weak coarse subangular blocky structure; very friable; common wavy discontinuous brown (7.5YR 5/6) fine sandy loam lamellae (Bt); strongly acid; gradual wavy boundary.

C—60 to 80 inches; strong brown (7.5YR 5/6) and brown (7.5YR 4/4) stratified loamy fine sand and fine sand; single grain; loose; strongly acid.

Series Range in Characteristics

Depth to the base of the argillic horizon: 40 to more than 80 inches

A or Ap horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
- Texture—loam or fine sandy loam
- pH range—5.1 to 7.3

Bt horizon:
- Color—hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 4 to 6
- Texture—sandy clay loam, fine sandy loam, or loam; includes thin layers of sandy loam or loamy fine sand
- pH range—4.5 to 7.3

E and Bt horizon:
- Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 6
- Texture—sand, fine sand, loamy fine sand, or loamy sand; lamellae and/or bands of sandy loam, loam, or fine sandy loam in some pedons
- pH range—4.5 to 6.0 in the upper part; ranges to 7.3 in the lower part

BC, CB, or C horizon (where present):
- Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6
- Texture—stratified fine sand, loamy fine sand, fine sandy loam, or loamy sand; includes thin strata of fine sand or loam
- pH range—5.1 to 7.3

Rahm Series

Taxonomic classification: Fine-silty, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts

Typical Pedon for the Series

Rahm silt loam, in a nearly level area in a cultivated field; 800 feet north and 110 feet west of the southeast corner of sec. 9, T. 8 S., R. 6 W.; Spencer County, Indiana.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine and medium granular structure; friable; brown (10YR 4/4) masses of iron accumulation in the matrix; neutral; abrupt smooth boundary.

Bg—8 to 24 inches; grayish brown (10YR 5/2) silt loam; weak medium and coarse subangular blocky structure; friable; common discontinuous faint light brownish gray (10YR 6/2) clay depletions on faces of peds and along root channels; many fine distinct yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

2Btgb—24 to 45 inches; light brownish gray (10YR 6/2) silty clay loam; weak coarse prismatic structure parting to moderate medium and coarse subangular blocky; firm; few discontinuous distinct light brownish gray (10YR 6/2) clay depletions on faces of peds and in pores; many fine prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; moderately acid; gradual smooth boundary.

2Btb—45 to 51 inches; yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) silty clay loam; moderate coarse prismatic structure parting to weak and moderate medium subangular blocky; firm; many distinct continuous light brownish gray (10YR 6/2) clay films on faces of peds; many fine very dark brown (10YR 2/2) iron and manganese concretions; strongly acid; gradual smooth boundary.

2C—51 to 80 inches; brown (7.5YR 4/4) and light brownish gray (10YR 6/2) silty clay loam; massive; firm; strongly acid.

Series Range in Characteristics

Depth to the base of soil development: 40 to 80 inches
Thickness of nonacid alluvium: 20 to 36 inches

Ap horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
- Texture—silt loam or silty clay loam
- pH range—6.1 to 7.3

Bg horizon:
- Color—hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4; redoximorphic features present
- Texture—silt loam or silty clay loam
- pH range—6.1 to 7.8

2Btgb or 2Btb horizon:
- Color—hue of 10YR, 7.5YR, or 2.5Y; value of 4 to 6; and chroma of 2 to 6; redoximorphic features present
- Texture—silty clay loam or silty clay
- pH range—4.5 to 7.3

2C horizon or 2BC horizon (where present):
- Color—hue 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6; redoximorphic features present
- Texture—silty clay loam or silty clay; includes thin strata of silt loam or loam
- pH range—4.5 to 6.5

Rickert Series

Taxonomic classification: Fine-silty, mixed, active, mesic Ultic Hapludalfs

Typical Pedon for the Series

Rickert silt loam, on a slope of 10 percent, in a pasture field; 875 feet west and 2,200 feet north of the southeast corner of sec. 5, T. 7 S., R. 1 W.; Perry County, Indiana.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots throughout; slightly acid; abrupt smooth boundary.

Bt1—8 to 14 inches; strong brown (7.5YR 5/6) silt loam; moderate fine subangular blocky structure; friable; many fine roots between peds; many faint continuous brown (7.5YR 4/4) clay films on faces of peds; common faint discontinuous brown (10YR 4/3) organic coatings in root channels and pores; moderately acid; clear wavy boundary.

Bt2—14 to 28 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots between peds; many faint continuous brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—28 to 39 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots between peds; many faint continuous brown (7.5YR 4/4) clay films on faces of peds; few faint discontinuous yellowish brown (10YR 5/4) silt coatings on faces of peds; very strongly acid; clear wavy boundary.

Bt4—39 to 49 inches; strong brown (7.5YR 5/6) silt loam; few medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine roots between peds; many faint continuous strong brown (7.5YR 4/6) clay films on faces of peds and common faint discontinuous yellowish brown (10YR 5/4) silt coatings on faces of peds; few black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

Bt5—49 to 60 inches; strong brown (7.5YR 5/6) silt loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; friable; common fine roots between peds; many faint continuous strong brown (7.5YR 4/6) clay films, and common faint continuous faint light brownish gray (10YR 6/2) clay depletions on faces of peds; few black (10YR 2/1) iron and manganese concretions; very strongly acid; clear wavy boundary.

Bt6—60 to 72 inches; strong brown (7.5YR 5/6) and light yellowish brown (10YR 6/4) silt loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable; many faint continuous strong brown (7.5YR 4/6) clay films on faces of peds; many medium prominent light gray (10YR 7/2) iron depletions in the matrix; few black (10YR 2/1) iron and manganese concretions; strongly acid; clear wavy boundary.

Bt7—72 to 80 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common faint discontinuous yellowish brown (10YR 5/4) and few faint patchy strong brown (7.5YR 4/6) clay films on faces of peds; many medium prominent light gray (10YR 7/2) iron depletions in the matrix; few black (10YR 2/1) iron and manganese concretions; strongly acid.

Series Range in Characteristics

Depth to the base of the argillic horizon: More than 80 inches

Ap horizon:
- Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 6
- Texture—silt loam
- pH range—4.5 to 5.0 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon (upper part):
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
- Texture—silt loam; less commonly silty clay loam
- pH range—4.5 to 6.0

Bt horizon (lower part):
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6; redoximorphic depletions present
- Texture—silt loam
- pH range—4.5 to 6.5

Ryker Series

Taxonomic classification: Fine-silty, mixed, active, mesic Typic Paleudalfs

Typical Pedon for the MLRA

Ryker silt loam, on a slope of 9 percent, in a hayfield; 2,050 feet south and 350 feet west of the northeast corner of sec. 13, T. 6 S., R. 2 W.; Perry County, Indiana.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate fine subangular blocky structure; friable; many fine roots; moderately acid; clear smooth boundary.
Bt1—6 to 10 inches; yellowish brown (10YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; many fine roots; common distinct discontinuous yellowish brown (10YR 5/4) clay films and very distinct patchy brown (10YR 5/3) organic coatings on faces of peds; strongly acid; clear wavy boundary.
Bt2—10 to 17 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots; many distinct continuous yellowish brown (10YR 5/4) clay films on faces of peds; moderately acid; clear wavy boundary.
Bt3—17 to 25 inches; dark yellowish brown (10YR 4/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many faint continuous reddish brown (5YR 4/4) and common distinct continuous yellowish brown (10YR 5/6) clay films on faces of peds; common fine irregular black (10YR 2/1) iron and manganese concretions; moderately acid; clear wavy boundary.
2Bt4—25 to 40 inches; yellowish red (5YR 4/6) silty clay loam; weak medium prismatic structure parting to moderate coarse subangular blocky; friable; common fine roots; many distinct continuous reddish brown (5YR 4/4) clay films on faces of peds; common fine irregular black (10YR 2/1) iron and manganese concretions; strongly acid; clear wavy boundary.
2Bt5—40 to 57 inches; yellowish red (5YR 4/6) silty clay loam; common medium prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; many distinct continuous reddish brown (5YR 4/4) clay films on faces of peds; common fine irregular black (10YR 2/1) iron and manganese concretions; very strongly acid; gradual wavy boundary.
2Bt6—57 to 75 inches; yellowish red (5YR 4/6) silty clay loam; many medium prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to strong medium subangular blocky; friable; common fine roots; common distinct discontinuous reddish brown (5YR 4/4) clay films on faces of peds; many coarse irregular black (10YR 2/1) iron and manganese concretions; strongly acid; clear wavy boundary.
2Bt7—75 to 84 inches; strong brown (7.5YR 4/6) clay loam; weak medium prismatic structure parting to strong medium angular blocky; firm; common prominent discontinuous brown (7.5YR 5/4) clay films and common prominent discontinuous very dark grayish brown (10YR 3/2) iron and manganese strains on faces of peds; common medium irregular black (10YR 2/1) iron and manganese concretions; 2 percent limestone cobbles and pebbles; strongly acid.

MLRA Range in Characteristics

Depth to the base of the argillic horizon and to lithic contact: 60 to more than 80 inches
Thickness of the loess: 20 to 40 inches

A or Ap horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3 (A—2 to 5 inches thick); hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6 (Ap)
Texture—silt loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8
Texture—silt loam or silty clay loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas in the upper part

2Bt horizon:
Color—hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8
Texture—silty clay loam or clay loam
Content of rock fragments—2 to 15 percent
pH range—4.5 to 5.5

Sciotoville Series

Taxonomic classification: Fine-silty, mixed, active, mesic Fragiaquic Hapludalfs
Taxadjunct features: The Sciotoville soils in this survey area do not have a subhorizon with a fragipan that has vertical streaks with a mean horizontal dimension of 4 inches or more. This difference, however, does not affect the usefulness or behavior of the soils.

Typical Pedon for the MLRA

Sciotoville silt loam, on a slope of 1 percent, in a cultivated field; 2,150 feet west and 1,200 feet south of the northeast corner of sec. 29, T. 7 S., R. 2 W.; Perry County, Indiana.

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; moderate medium granular structure; friable; many

fine roots; 1 percent rounded quartzite pebbles; strongly acid; abrupt smooth boundary.
Bt1—9 to 15 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common fine roots between peds; common faint discontinuous strong brown (7.5YR 5/6) clay films on faces of peds; 1 percent rounded quartzite pebbles; strongly acid; clear wavy boundary.
Bt2—15 to 23 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common fine roots between peds; common faint discontinuous strong brown (7.5YR 5/6) clay films on faces of peds; common fine and medium prominent light gray (10YR 7/2) iron depletions in the matrix; 1 percent rounded quartzite pebbles; very strongly acid; clear wavy boundary.
Bt/Eg—23 to 27 inches; 60 percent strong brown (7.5YR 4/6) silt loam (Bt); weak medium prismatic structure parting to strong medium subangular blocky; firm; common distinct discontinuous brown (7.5YR 4/4) clay films on faces of peds; 40 percent light brownish gray (10YR 6/2) silt loam (Eg); common fine faint pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; 1 percent rounded quartzite pebbles; very strongly acid; clear wavy boundary.
Btx1—27 to 32 inches; strong brown (7.5YR 4/6) silty clay loam; moderate medium and coarse prismatic structure; very firm; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; many prominent continuous light gray (10YR 7/2) clay depletions on faces of peds; 1 percent rounded quartzite pebbles; 75 percent brittle; very strongly acid; clear wavy boundary.
Btx2—32 to 41 inches; strong brown (7.5YR 4/6) clay loam; moderate medium and coarse prismatic structure; very firm; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; many prominent continuous light gray (10YR 7/2) clay depletions on faces of peds; 1 percent rounded quartzite pebbles; 75 percent brittle; very strongly acid; clear wavy boundary.
Btx3—41 to 50 inches; strong brown (7.5YR 4/6) loam; moderate medium and coarse prismatic structure; very firm; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; many prominent continuous light gray (10YR 7/2) clay depletions on faces of peds; 1 percent rounded quartzite pebbles; brittle; very strongly acid; clear wavy boundary.
B't—50 to 80 inches; strong brown (7.5YR 4/6) loam; moderate medium subangular blocky structure; friable; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; 2 percent rounded quartzite pebbles; strongly acid.

MLRA Range in Characteristics

Depth to the base of the argillic horizon: 60 to more than 80 inches

A or Ap horizon:
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4
- Texture—silt loam
- Content of rock fragments—0 to 2 percent pebbles
- pH range—5.1 to 6.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt or Bt/Eg horizon:
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6 with redoximorphic depletions in the upper 10 inches (Bt); hue of 10YR, value of 5 to 7, and chroma of 1 or 2 (Eg)
- Texture—silt loam or silty clay loam
- Content of rock fragments—0 to 5 percent pebbles
- pH range—4.5 to 5.5

Btx horizon:
- Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6
- Texture—silt loam, silty clay loam, loam, or clay loam
- Content of rock fragments—0 to 5 percent pebbles
- pH range—4.5 to 5.5

B't horizon and BC horizon (where present):
- Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6
- Texture—loam, silt loam, or silty clay loam; less commonly clay loam or sandy loam
- Content of rock fragments—0 to 15 percent pebbles
- pH range—4.5 to 6.5

Shircliff Series

Taxonomic classification: Fine, mixed, active, mesic Oxyaquic Hapludalfs

Typical Pedon for the Series

Shircliff silt loam, on a slope of 4 percent, in a cultivated field; 400 feet east and 750 feet north of the southwest corner of sec. 13, T. 5 S., R. 1 W.; Perry County, Indiana.

Ap—0 to 8 inches; 90 percent brown (10YR 5/3) and 10 percent yellowish brown (10YR 5/6) silt loam, very pale brown (10YR 7/3 and 7/4) dry; weak fine subangular blocky structure; friable; many fine roots; strongly acid; abrupt smooth boundary.
Bt1—8 to 19 inches; yellowish brown (10YR 5/6) silty

clay loam; strong fine subangular blocky structure; friable; common fine roots; common distinct discontinuous dark yellowish brown (10YR 4/6) clay films on faces of peds; many distinct patchy light yellowish brown (10YR 6/4) silt coatings on faces of peds; very strongly acid; clear wavy boundary.

2Bt2—19 to 28 inches; strong brown (7.5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; common fine roots; many distinct discontinuous brown (7.5YR 4/4) clay films on faces of peds; few distinct patchy light yellowish brown (10YR 6/4) silt coatings on faces of peds; common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; very strongly acid; clear wavy boundary.

2Bt3—28 to 43 inches; dark yellowish brown (10YR 4/4) silty clay; strong coarse angular blocky structure; very firm; few fine roots; many prominent continuous light brownish gray (10YR 6/2) clay films on faces of peds; many medium distinct gray (10YR 6/1) iron depletions in the matrix; moderately acid; clear wavy boundary.

2Btk1—43 to 53 inches; dark yellowish brown (10YR 4/4) silty clay; strong coarse angular blocky structure; very firm; few fine roots; common distinct discontinuous brown (10YR 5/3) and few distinct discontinuous light brownish gray (10YR 6/2) clay films on faces of peds; many medium distinct gray (10YR 6/1) iron depletions in the matrix; few medium irregular calcium carbonate nodules; slightly effervescent; moderately alkaline; clear wavy boundary.

2Btk2—53 to 59 inches; brown (10YR 5/3) silty clay loam; moderate coarse subangular blocky structure; firm; few fine roots; few prominent patchy light brownish gray (10YR 6/2) clay films on faces of peds; common fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; many coarse prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few medium irregular calcium carbonate nodules; strongly effervescent; moderately alkaline; clear wavy boundary.

2Btk3—59 to 80 inches; dark yellowish brown (10YR 4/4) silty clay; strong coarse subangular blocky structure; very firm; common distinct discontinuous brown (10YR 5/3) and few prominent discontinuous gray (10YR 6/1) clay films on faces of peds; common fine distinct gray (10YR 6/1) iron depletions in the matrix; few medium irregular calcium carbonate nodules; strongly effervescent; moderately alkaline.

Series Range in Characteristics

Depth to the base of the argillic horizon: 40 to more than 80 inches

Depth to carbonates: 30 to 60 inches; eroded areas can range to less than a depth of 30 inches

A or Ap horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 3 (A—less than 5 inches thick); hue of 10YR, value of 4 or 5, and chroma of 2 or 3 (Ap)
- Texture—silt loam
- pH range—5.1 to 7.3

Bt horizon:
- Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6
- Texture—silt loam or silty clay loam
- pH range—4.5 to 6.0

2Bt horizon:
- Color—hue of 2.5Y, 10YR, or 7.5YR; value of 4 or 5; and chroma of 4 to 6; redoximorphic depletions present
- Texture—silty clay loam or silty clay
- pH range—4.5 to 7.8

2Btk, 2BCk, 2Btgk, or 2BCgk horizon:
- Color—hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 4
- Texture—silty clay; less commonly includes silt loam or silty clay loam
- pH range—7.9 to 8.4

Stendal Series

Taxonomic classification: Fine-silty, mixed, active, acid, mesic Fluventic Endoaquepts

Typical Pedon for the Series

Stendal silt loam, in a nearly level area in a cultivated field; 1,400 feet north and 395 feet west of the southeast corner of sec. 29, T. 3 N., R. 7 E.; Scott County, Indiana.

Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam, very pale brown (10YR 7/4) dry; weak medium subangular blocky structure parting to moderate medium granular; friable; common very fine roots; slightly acid; abrupt smooth boundary.

C—8 to 17 inches; light yellowish brown (10YR 6/4) silt loam; weak coarse prismatic structure; friable; common very fine roots; many medium prominent light brownish gray (2.5Y 6/2) iron depletions in the matrix; common fine distinct brownish yellow

(10YR 6/8) masses of iron accumulation in the matrix; common distinct continuous yellowish brown (10YR 5/4) organic coatings on faces of peds; few fine rounded black (10YR 2/1) iron and manganese concretions; very strongly acid; gradual wavy boundary.

Cg1—17 to 40 inches; light brownish gray (2.5Y 6/2) silt loam; weak coarse prismatic structure; friable; few very fine roots; many medium prominent yellowish brown (10YR 6/4) and common yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few distinct continuous yellowish brown (10YR 5/4) organic coatings on vertical faces of peds; common fine rounded and few medium irregular black (10YR 2/1) iron and manganese concretions; very strongly acid; gradual smooth boundary.

Cg2—40 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; massive; firm; many medium prominent strong brown (7.5YR 5/8) and common distinct light yellowish brown (10YR 6/4) masses of iron accumulation in the matrix; common medium irregular and few medium irregular black (10YR 2/1) iron and manganese concretions; very strongly acid.

Series Range in Characteristics

A or Ap horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 1 or 2 (A—1 to 3 inches thick); hue of 10YR, value of 4 or 5, and chroma of 2 to 4 (Ap)
Texture—silt loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

C horizon (above a depth of 20 inches):

Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6; redoximorphic features present
Texture—silt loam
pH range—4.5 to 5.5

Cg or C horizon (below a depth of 20 inches):

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 6; redoximorphic features present
Texture—silt loam; less commonly silty clay loam; includes strata of loam, fine sandy loam, or sandy loam below a depth of 40 inches
pH range—4.5 to 5.5

Tapawingo Series

Taxonomic classification: Fine-loamy, mixed, active, nonacid, mesic Typic Udorthents

Typical Pedon for the MLRA

Tapawingo silt loam, on a slope of 7 percent, in a sod field; 1,770 feet west and 550 feet south of the northeast corner of sec. 12, T. 4 S., R. 3 W.; Perry County, Indiana.

Ap—0 to 4 inches; mixed, 50 percent brown (10YR 4/3), 25 percent yellowish brown (10YR 5/6), and 25 percent brown (10YR 5/3) silt loam; moderate coarse and medium subangular blocky structure; friable; 2 percent channers (siltstone); moderately acid; clear smooth boundary.

CA—4 to 16 inches; mixed, 60 percent dark yellowish brown (10YR 4/4), 20 percent yellowish brown (10YR 5/6), and 20 percent strong brown (7.5YR 5/6) parachannery silty clay loam; 1/4- to 1/2-inch thick platy clods parting to weak fine angular and subangular blocky clods; firm; 20 percent parachanners; 2 percent channers; strongly acid; gradual smooth boundary.

Cd1—16 to 33 inches; mixed, 60 percent strong brown (7.5YR 5/8), 20 percent yellowish brown (10YR 5/6), and 20 percent gray (10YR 6/1) silty clay loam; 1/2- to 2-inch thick platy clods; very firm; 5 percent channers (shale and siltstone); strongly acid; gradual smooth boundary.

Cd2—33 to 38 inches; mixed, 75 percent yellowish brown (10YR 5/6) and 25 percent light gray (10YR 7/1) silty clay loam; 1/2- to 2-inch thick platy clods; very firm; 5 percent channers (shale and siltstone); strongly acid; gradual smooth boundary.

2C—38 to 80 inches; mixed, dark gray (10YR 4/1) very parachannery silty clay loam; massive; firm; many medium prominent yellowish brown (10YR 5/8) and light gray (10YR 7/1) mottles; 35 percent parachanners (shale and siltstone); 5 percent channers; moderately acid.

MLRA Range in Characteristics

Thickness of the soil material that overlies graded spoil: 20 to 40 inches

Ap horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 3 to 6
Texture—silt loam
Content of rock fragments—1 to 5 percent
pH range—5.6 to 6.5 in nonlimed areas; ranges to 7.3 in limed areas

CA horizon:

Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 8

Texture—silt loam, silty clay loam, loam, or clay loam or the parachannery analogs of these textures
Content of rock fragments—1 to 10 percent
Content of pararock fragments—0 to 30 percent
pH range—5.1 to 7.3

Cd horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 1 to 8
Texture—silt loam or silty clay loam; less commonly loam or clay loam
Content of rock fragments—1 to 15 percent
pH range—5.1 to 7.3

2C horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 1 to 8
Texture—parachannery or very parachannery silt loam or silty clay loam
Content of rock fragments—2 to 25 percent
Content of pararock fragments—20 to 60 percent
pH range—5.6 to 7.3

Tipsaw Series

Taxonomic classification: Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts

Typical Pedon for the Series

Tipsaw very fine sandy loam, on a slope of 45 percent, in a wooded area; 400 feet south and 300 feet west of the northeast corner of sec. 3, T. 4 S., R. 3 W.; Perry County, Indiana.

A—0 to 2 inches; 80 percent very dark gray (10YR 3/1) and 20 percent brown (10YR 5/3) very fine sandy loam, dark gray (10YR 4/1) and light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; many fine and medium roots throughout; 5 percent strongly cemented sandstone channers; extremely acid; clear smooth boundary.
E—2 to 5 inches; brown (10YR 5/3) very fine sandy loam, very pale brown (10YR 7/3) dry; weak very fine subangular blocky structure; friable; many fine and medium roots throughout; 14 percent strongly cemented sandstone channers; extremely acid; clear wavy boundary.
Bw1—5 to 13 inches; yellowish brown (10YR 5/6) parachannery very fine sandy loam; moderate fine subangular blocky structure; friable; common fine and medium roots throughout; 10 percent strongly cemented sandstone channers and 25 percent weakly cemented sandstone parachanners; very strongly acid; clear wavy boundary.
Bw2—13 to 20 inches; yellowish brown (10YR 5/6) channery very fine sandy loam; moderate fine subangular blocky structure; friable; common fine roots throughout; common continuous distinct light yellowish brown (10YR 6/4) skeletans (sand or silt) on faces of peds and in pores; 30 percent strongly cemented sandstone channers and 30 percent weakly cemented parachanners; very strongly acid; clear wavy boundary.
BC—20 to 28 inches; strong brown (7.5YR 5/6) channery loam; weak coarse prismatic structure parting to moderate fine subangular blocky; friable; common discontinuous distinct very pale brown (10YR 7/3) skeletans (sand or silt) on faces of peds and in pores; 30 percent strongly cemented sandstone channers and 30 percent weakly cemented parachanners; extremely acid; clear wavy boundary.
Cr—28 to 60 inches; weakly cemented and moderately cemented sandstone interbedded with siltstone, shale, and very strongly cemented sandstone.

Series Range in Characteristics

Depth to the base of the cambic horizon and to paralithic contact: 20 to 40 inches
Kind of rock fragments: Sandstone channers

A horizon:
Color—hue of 10YR, value of 2 to 5, and chroma of 1 to 4
Texture—very fine sandy loam
Content of pararock fragments—0 to 15 percent
Content of rock fragments—0 to 15 percent
pH range—3.5 to 5.5

E horizon and EB horizon (where present):
Color—hue of 10YR, value of 4 to 6, and chroma of 3 or 4
Texture—loam, sandy loam, fine sandy loam, or very fine sandy loam or the channery or parachannery analogs of these textures
Content of pararock fragments—0 to 30 percent
Content of rock fragments—0 to 30 percent
pH range—3.5 to 5.5

Bw horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 6
Texture—loam, sandy loam, fine sandy loam, or very fine sandy loam or the channery and parachannery to extremely parachannery analogs of these textures; less commonly silt loam or the channery and parachannery to extremely parachannery analogs of this texture
Content of pararock fragments—5 to 70 percent

Content of rock fragments—10 to 35 percent
pH range—3.5 to 5.5

BC horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 8
Texture—loam, sandy loam, or very fine sandy loam or the channery and parachannery to extremely parachannery analogs of these textures
Content of pararock fragments—5 to 70 percent
Content of rock fragments—10 to 35 percent
pH range—3.5 to 5.5

Cr horizon:
Texture—weakly or moderately cemented sandstone interbedded with siltstone, shale, and strongly cemented to indurated sandstone

Tobinsport Series

Taxonomic classification: Fine-silty, mixed, active, mesic Ultic Hapludalfs

Typical Pedon for the Series

Tobinsport silt loam, on a slope of 1 percent, in a cultivated field; 1,475 feet west and 100 feet south of the northeast corner of sec. 32, T. 7 S., R. 2 W.; Perry County, Indiana.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; friable; common fine roots; neutral; abrupt smooth boundary.
Bt1—9 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct discontinuous brown (10YR 4/3) organo-clay films on faces of peds; neutral; clear wavy boundary.
Bt2—12 to 18 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; many distinct continuous brown (7.5YR 5/4) clay films on faces of peds and in pores; few distinct discontinuous brown (10YR 4/3) organic coatings on faces of peds; slightly acid; clear wavy boundary.
Bt3—18 to 27 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many distinct continuous brown (7.5YR 5/4) clay films on faces of peds; strongly acid; clear wavy boundary.
2Bt4—27 to 41 inches; strong brown (7.5YR 5/6) loam; moderate fine subangular blocky structure; friable; many distinct discontinuous brown (7.5YR 5/4) clay films on faces of peds; very strongly acid; clear wavy boundary.
2Bt5—41 to 52 inches; strong brown (7.5YR 5/6) very fine sandy loam; moderate fine subangular blocky structure; friable; common distinct discontinuous brown (7.5YR 5/4) clay films on faces of peds; very strongly acid; clear wavy boundary.
3C and Bt1—52 to 60 inches; 70 percent dark yellowish brown (10YR 4/4) loamy fine sand (C); massive; very friable; 30 percent strong brown (7.5YR 5/6) fine sandy loam (Bt); weak fine subangular blocky structure; very friable; common distinct discontinuous brown (7.5YR 5/4) clay films on faces of peds; very strongly acid; clear wavy boundary.
3C and Bt2—60 to 75 inches; 80 percent brown (10YR 4/3) loamy fine sand (C); massive; very friable; 20 percent yellowish brown (10YR 5/4) fine sandy loam (Bt); weak fine granular structure; very friable; few faint discontinuous brown (7.5YR 5/4) clay bridges between sand grains; very strongly acid; clear wavy boundary.
3C and Bt3—75 to 80 inches; 80 percent brown (10YR 4/3) loamy fine sand (C); massive; very friable; 20 percent brown (7.5YR 4/4) fine sandy loam (Bt); weak fine granular structure; very friable; few faint discontinuous brown (7.5YR 4/4) clay bridges between sand grains; common prominent black (10YR 2/1) iron and manganese oxide stains; very strongly acid.

Series Range in Characteristics

Depth to the base of the argillic horizon: 60 to more than 80 inches
Thickness of the loess: 20 to 40 inches
Depth to the 3C and Bt horizon: More than 40 inches

Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—silt loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon and BE horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 6
Texture—silt loam or silty clay loam
pH range—4.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas in the upper part

2Bt horizon:
Color—hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8
Texture—fine sandy loam, very fine sandy loam, or loam
pH range—4.5 to 5.5

3C and Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8
Texture—loamy very fine sand or loamy fine sand (C); fine sandy loam, loamy fine sand, or very fine sandy loam (Bt—bands and lamallae)
pH range—4.5 to 5.5

Udipsamments

Taxonomic classification: Mixed, mesic Typic Udipsamments

Typical Pedon for the MLRA

Udipsamments sandy loam, on a slope of 4 percent, in a wooded area; 1,300 feet south and 4,800 feet west of the northeast corner of sec. 5, T. 8 S., R. 2 W.; Perry County, Indiana.

A—0 to 5 inches; dark brown (10YR 3/3) rubbed, sandy loam; weak fine granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.
C1—5 to 24 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; common fine roots; neutral; clear wavy boundary.
C2—24 to 36 inches; yellowish brown (10YR 5/4) sand; single grain; loose; neutral; clear wavy boundary.
C3—36 to 60 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; few thin strata of charcoal less than 1/2 inch thick; neutral.

MLRA Range in Characteristics

A or Ap horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 3
Texture—sandy loam
pH range—5.6 to 7.3

C horizon:
Color—hue of 10YR, value of 4 to 6, and chroma of 4 to 6
Texture—sand or fine sand
pH range—5.6 to 7.3

Wakeland Series

Taxonomic classification: Coarse-silty, mixed, superactive, nonacid, mesic Aeric Fluvaquents

Typical Pedon for the Series

Wakeland silt loam, in a nearly level area in a cultivated field; 2,000 feet southwest of the east corner and 1,000 feet northwest of the southeast boundary of donation 187, T. 4 N., R. 9 W.; Knox County, Indiana.

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.
Cg1—7 to 23 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; friable; common fine roots; many fine faint brown (10YR 5/3) masses of iron accumulation in the matrix; neutral; clear wavy boundary.
Cg2—23 to 29 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; common fine roots; common medium distinct yellowish brown (10YR 5/4) masses of iron accumulation, and few fine faint gray (10YR 5/1) iron depletions in the matrix; neutral; gradual wavy boundary.
Cg3—29 to 60 inches; grayish brown (10YR 5/2) silt loam; massive; friable; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid.

Series Range in Characteristics

A or Ap horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 1 to 4 (A—1 to 3 inches thick); hue of 10YR, value of 4 or 5, and chroma of 2 to 4 (Ap)
Texture—silt loam
pH range—5.6 to 7.3

C or Cg horizon (upper part):
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 4; iron depletions present
Texture—silt loam
pH range—5.6 to 7.8

C or Cg horizon (lower part):
Color—hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 1 to 6; iron depletions present
Texture—silt loam; includes loam and thin strata of fine sandy loam or sandy loam below a depth of 40 inches
pH range—5.6 to 7.8

Wellston Series

Taxonomic classification: Fine-silty, mixed, active, mesic Ultic Hapludalfs

Typical Pedon for the MLRA

Wellston silt loam, on a slope of 14 percent, in a pasture field; 600 feet north and 2,250 feet east of the southwest corner of sec. 30, T. 4 S., R. 3 W.; Perry County, Indiana.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.
Bt1—8 to 19 inches; strong brown (7.5YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common fine roots; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; few fine black (10YR 2/1) weakly cemented concretions; very strongly acid; gradual smooth boundary.
Bt2—19 to 26 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds; few fine black (10YR 2/1) weakly cemented concretions; very strongly acid; gradual smooth boundary.
2Bt3—26 to 37 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; few fine roots; common distinct discontinuous yellowish brown (10YR 5/4) and brown (7.5YR 4/4) clay films on faces of peds; few fine black (10YR 2/1) weakly cemented concretions; 2 percent channers; very strongly acid; gradual smooth boundary.
2Bt4—37 to 41 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; few fine roots; common distinct discontinuous yellowish brown (10YR 5/4) and brown (7.5YR 4/4) clay films on faces of peds; few fine black (10YR 2/1) weakly cemented concretions; 5 percent channers; very strongly acid; gradual smooth boundary.
2BC1—41 to 50 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; few fine black (10YR 2/1) weakly cemented concretions; 5 percent channers; very strongly acid; clear smooth boundary.
2BC2—50 to 54 inches; yellowish brown (10YR 5/4) parachannery fine sandy loam and channery fine sandy loam; weak thin platy structure parting to weak very fine subangular blocky; very friable; common prominent discontinuous yellowish red (5YR 4/6) iron oxide stains on faces of peds; common fine black (10YR 2/1) weakly cemented concretions; 30 percent parachanners; 20 percent channers; very strongly acid; clear smooth boundary.
2Cr—54 to 60 inches; weakly cemented sandstone interbedded with very strongly cemented sandstone and weakly cemented shale.

MLRA Range in Characteristics

Depth to the base of the argillic horizon: 32 to 55 inches
Thickness of the loess: 20 to 40 inches
Depth to paralithic contact: 40 to 60 inches

A or Ap horizon:
Color—hue of 10YR, value of 2 to 4, and chroma of 1 or 2 (A); hue of 10YR, value of 4 or 5, and chroma of 2 to 6 (Ap)
Texture—silt loam
pH range—3.5 to 5.5 in nonlimed areas; ranges to 7.3 in limed areas

Bt horizon and BE horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8
Texture—silt loam or silty clay loam
pH range—3.5 to 5.5 in nonlimed areas; ranges to 6.0 in limed areas in the upper part

2Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture—loam, fine sandy loam, or sandy loam; less commonly silt loam, clay loam, or sandy clay loam
Content of rock fragments—2 to 15 percent channers
Content of pararock fragments—0 to 15 percent parachanners
pH range—4.5 to 5.5

2BC horizon and 2CB horizon (where present):
Color—hue of 10YR, 7.5YR, or 2.5Y; value of 4 or 5; and chroma of 4 to 8
Texture—channery, parachannery, or very parachannery analogs of loam, fine sandy loam, or sandy loam; less commonly silt loam, clay loam, or sandy clay loam
Content of rock fragments—10 to 35 percent channers
Content of pararock fragments—10 to 60 percent parachanners
pH range—4.5 to 5.5

Wilbur Series

Taxonomic classification: Coarse-silty, mixed, superactive, mesic Fluvaquentic Eutrudepts

Typical Pedon for the Series

Wilbur silt loam, in a nearly level area in a cultivated

field; 2,245 feet north and 1,450 feet east of the southwest corner of donation 99, T. 1 S., R. 10 W.; Gibson County, Indiana.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; neutral; clear smooth boundary.
Bw1—7 to 17 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct brown (10YR 5/3) mottles; weak fine subangular blocky structure; friable; few fine roots; neutral; gradual smooth boundary.
Bw2—17 to 32 inches; brown (10YR 5/3) silt loam; weak medium subangular blocky structure; friable; few fine faint grayish brown (10YR 5/2) iron depletions in the matrix; neutral; clear smooth boundary.
Cg—32 to 60 inches; light brownish gray (10YR 6/2) silt loam; massive; many fine prominent brown (7.5YR 4/4) and common dark yellowish brown (10YR 4/4) masses of iron accumulation in the matrix; neutral.

Series Range in Characteristics

Depth to the base of the cambic horizon: 24 to 42 inches

A or Ap horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
Texture—silt loam
pH range—5.6 to 7.3; depends upon liming history

Bw horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 to 6; iron depletions in the lower part
Texture—silt loam
pH range—5.6 to 7.8

C or Cg horizon:
Color—hue of 10YR, value of 4 to 6, and chroma of 2 to 6; redoximorphic features present
Texture—silt loam; includes loam and thin strata of fine sandy loam or sandy loam below a depth of 40 inches
pH range—5.6 to 7.8

Wirt Series

Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Dystric Fluventic Eutrudepts

Typical Pedon for the Series

Wirt loam, in a nearly level area in a pasture field; 50 feet south and 2,085 feet east of the northwest corner of sec. 24, T. 3 N., R. 8 E.; Jefferson County, Indiana.

Ap—0 to 8 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; moderate medium granular structure, and weak thin platy structure in the lower part; friable; many fine roots; neutral; clear smooth boundary.
Bw1—8 to 15 inches; brown (10YR 4/3) silt loam; common fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; common fine roots; few distinct discontinuous faint dark brown (10YR 3/3) organic coatings on faces of peds; neutral; gradual smooth boundary.
Bw2—15 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; many distinct discontinuous dark brown (10YR 3/3) organic coatings on faces of peds; neutral; gradual wavy boundary.
Bw3—22 to 38 inches; dark yellowish brown (10YR 4/6) loam; few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; many distinct discontinuous dark brown (10YR 3/3) organic coatings on faces of peds; neutral; gradual wavy boundary.
C1—38 to 50 inches; dark yellowish brown (10YR 4/6) sandy loam; common fine distinct pale brown (10YR 6/3) mottles; massive; friable; 1 percent pebbles; neutral; gradual wavy boundary.
C2—50 to 60 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; massive; friable; 25 percent pebbles; neutral.

Series Range in Characteristics

Depth to the base of the cambic horizon: 24 to 48 inches

A or Ap horizon:
Color—value of 2 or 3 and chroma of 2 to 4 (A—1 to 6 inches thick); hue of 10YR, value of 4 or 5, and chroma of 3 or 4 (Ap)
Texture—loam
pH range—5.6 to 7.3

Bw horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 3 to 6
Texture—loam, silt loam, sandy loam, fine sandy loam, or very fine sandy loam
Content of rock fragments—0 to 14 percent pebbles

pH range—5.6 to 7.3

C horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 3 to 6
Texture—loam, fine sandy loam, or sandy loam above a depth of 40 inches; loam, fine sandy loam, or sandy loam below a depth of 40 inches; includes the gravelly analogs and strata of loamy fine sand or loamy sand
Content of rock fragments—0 to 35 percent pebbles
pH range—5.6 to 7.3

Woodmere Series

Taxonomic classification: Fine, mixed, active, mesic Oxyaquic Eutrudepts

Typical Pedon for the Series

Woodmere silty clay loam, on a slope of 1 percent, in a cultivated field; 1,300 feet north and 30 feet east of the southwest corner of sec. 34, T. 7 S., R. 11 W.; Vanderburgh County, Indiana.

Ap—0 to 10 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.
Bw—10 to 30 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; firm; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; few mica flakes; neutral; abrupt wavy boundary.
2Bwb—30 to 42 inches; brown (7.5YR 4/4) silty clay; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; common mica flakes; moderately acid; clear wavy boundary.
2Btb1—42 to 59 inches; brown (7.5YR 4/4) silty clay loam; weak medium prismatic structure parting to weak medium and coarse subangular blocky; firm; few discontinuous distinct dark brown (10YR 3/3) organo-clay films on faces of peds; few discontinuous prominent light brownish gray (10YR 6/2) clay depletions on faces of peds; common mica flakes; strongly acid; gradual wavy boundary.
2Btb2—59 to 80 inches; strong brown (7.5YR 5/6) silty clay loam; weak medium prismatic structure parting to weak medium and coarse subangular blocky; firm; few distinct discontinuous brown (7.5YR 4/4) clay films on faces of peds; few distinct discontinuous light brownish gray (10YR 6/2) clay depletions on faces of peds; few black (10YR 2/1) iron and manganese concretions; common mica flakes; strongly acid.

Series Range in Characteristics

Depth to the base of soil development: 50 to more than 80 inches
Thickness of recent alluvium: 20 to 36 inches

Ap horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4
Texture—silty clay loam
pH range—6.1 to 7.3

Bw horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—silty clay loam or silt loam
pH range—6.1 to 7.3

2Bwb horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—silty clay loam or silty clay
pH range—4.5 to 6.0

2Btb horizon and 2BC or 2C horizon (where present):
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6; redoximorphic depletions present
Texture—silty clay loam or clay loam; less commonly silty clay; includes thin strata of loam or sandy loam
pH range—4.5 to 6.0

Zipp Series

Taxonomic classification: Fine, mixed, active, nonacid, mesic Typic Endoaquepts

Typical Pedon for the Series

Zipp silty clay, in a nearly level area in a cultivated field; 200 feet north and 1,200 feet east of the southwest corner of the southwest quarter of sec. 28, T. 6 S., R. 8 W.; Warrick County, Indiana.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; firm; neutral; abrupt smooth boundary.
Bg1—10 to 15 inches; dark gray (5Y 4/1) silty clay loam; moderate fine angular blocky structure; firm; many faint continuous dark gray (5Y 4/1) pressure films on

faces of peds; many fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

Bg2—15 to 35 inches; gray (5Y 5/1) silty clay loam; moderate medium prismatic structure parting to strong fine angular blocky; firm; many faint continuous dark gray (5Y 4/1) pressure films on faces of peds; many fine prominent yellowish brown (10YR 5/6) and few fine distinct light olive brown (2.5Y 5/4) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

Bg3—35 to 45 inches; gray (5Y 4/1) silty clay; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

Cg—45 to 60 inches; gray (10YR 6/1) silty clay; massive; firm; many fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral.

Series Range in Characteristics

Depth to the base of the cambic horizon: 36 to 48 inches

Ap horizon:

Color—hue of 10YR, value of 4, and chroma of 1 or 2
Texture—silty clay loam or silty clay
pH range—5.6 to 7.3

Bg horizon:

Color—hue of 10YR, 2.5Y, 5Y, or N; value of 4 to 6; and chroma of 0 or 1
Texture—silty clay loam or silty clay
pH range—5.6 to 7.3

Cg or C horizon:

Color—hue of 5Y to 10YR or N, value of 4 to 7, and chroma of 0 to 6
Texture—silty clay loam or silty clay; includes thin strata of silt loam
pH range—6.6 to 8.4

Formation of the Soils

This section explains the major factors of soil formation that affected the soils in Perry County. The processes of soil formation also are described.

Factors of Soil Formation

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

Parent material greatly affects the kind of soil profile that forms. Climate and plant and animal life, chiefly plants, are active factors of soil formation. They act upon the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effects of climate and plant and animal life are influenced by relief. Finally, time is needed for the transformation of the parent material into a soil. Some time is always required for the differentiation of soil horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four.

Parent Material and Geology

Henry H.Gray, head stratigrapher—retired, Geology Section, Geological Survey, Indiana Department of Natural Resources, helped prepare this section.

Parent material is the unconsolidated mass in which a soil forms. It ranges from residuum from sandstone; siltstone; or shale to clay, sand, or silt deposited by glaciers, water, or wind. Some soils formed in two or more of these kinds of material. For example, the upper part of the Apalona soils formed in loess and the lower part formed in residuum derived from interbedded shale and sandstone.

A visitor to Perry County is likely to carry away two distinct impressions of the landscape of the county—one, a panorama of rugged tree-covered hills; the other, a vista of the broad, fertile valley of the Ohio River. These two impressions single out visible aspects of the geologic history of Perry County.

Beneath the upland areas and rocky hillsides are layers or beds of rocks of several types—sandstone, shale, siltstone, limestone, coal, and clay. These sedimentary rocks record the earlier phase of Perry County's geologic story. In the limestone, and in some of the shale, are fossilized shells resembling shells now found along warm seashores. In other shale, in the coal beds and in some of the sandstone, are fossils of large land plants of fernlike appearance. It does not take too much imagination to think of all these rocks as the hardened deposits of ancient streams, beaches, swamps, mudflats, and warm coral seas.

Wells drilled in Perry County have gone to a depth of 3,500 feet without reaching the bottom of this sedimentary rock sequence, and other geological evidence suggests that 5,000 feet more must be passed through before reaching the very ancient granite "basement" that underlies the sedimentary rocks. These deposits took perhaps a quarter of a billion years to accumulate, and this episode in the geologic history of Perry County came to a close about 200 million years ago.

The thick sequence of sedimentary rock was uplifted and slightly tilted so that the seas and swamps were drained. Erosion began to carve the surface of the land, and for most of the rest of geologic time, this process was at work shaping the hills of Perry County. Geologically speaking, the final event that strongly influenced the landscape and the geologic deposits of the county began about a million years ago. From the far north, glaciers advanced into Indiana and withdrew, not just once but three or four times. The ice sheets themselves never reached Perry County, but great quantities of meltwater flowed down the Ohio River and left thick deposits of sand to record their passage. This episode ended about 20,000 years ago, as the last glacier finally receded from the drainage area of the Ohio River. Since then, geologically just an instant ago, the slow but relentless process of erosion has put only

minor finishing touches on the landscape of Perry County. We can watch these changes taking place today, in the blowing away of a bit of dust from a dry field, or the washing out of a bit of stream bank, or the downhill sliding of a bit of earth on a steep and unprotected slope after a spring thaw.

All the bedrock of Perry County is of sedimentary origin—that is, the materials that now make up the rocks were deposited as grains of sand, silt, or clay; as limy muds of organic origin; as shells or wave-tossed shell fragments; or as leaves, stems, and woody pieces of plant material. After burial, the sediments were converted into rocks by pressure and by chemical deposition of cementing material in the pore spaces of the loose sediments. Two distinct ages of bedrock are recognized in the county. The younger rocks are Pennsylvanian in age (280 to 320 million years ago) and consist mainly of sandstone and shale but also contain beds of coal and plastic clay. The older rocks are Mississippian in age (320 to 345 million years ago) and include shale, sandstone, limestone, and limy shale.

There are two ages of Mississippian rocks in Perry County. The oldest Mississippian deposits are at least 250 feet thick and consist of five principal rock types in beds 5 to 30 feet thick. Fine grained, evenly layered sandstone that weathers into slabs makes up about 30 percent of the unit. Irregularly layered sandstone that forms bluffs and breaks into large, irregular blocks comprise about 15 percent of the unit. Gray, reddish brown, and greenish gray shales make up 30 percent of the unit. Shales are not weather-resistant and break down readily into clay. Gray fossiliferous limestone, principally in four beds 10 to 30 feet thick, makes up a total of 25 percent of the unit. The beds of sandstone and shale are variable in thickness and extent, but the limestone beds are quite consistent and are valuable guides in mapping the rocks. The uppermost of these limestone beds marks the top of the unit. No extensive limestone beds are found in younger units above. This unit is exposed along the lower valley walls in the eastern half of the county and extends westward across the county beneath the younger rocks.

The next younger Mississippian age rock deposit is about 300 feet thick in the southern part of the county and 200 feet thick in the northern part. This thinning, and the irregular upper surface of this unit, result from uplift and erosion that took place after the rocks of this unit had been deposited and before the overlying Pennsylvanian rocks were laid down. The rock layers of this unit are variable in thickness and extent, and no one bed is continuous from one end of the county to the other. About 70 percent of this unit consists of greenish gray, reddish brown, and gray shale, much of which is limy. These rocks weather rapidly into clay. Evenly layered fine grained sandstone that weathers into small slabs makes up 15 percent of the unit. Irregularly layered sandstone, which makes up 5 percent of the unit, is found principally in the lower part along Oil Creek Valley just south of St. Croix, where it forms prominent bluffs. Apalona, Deuchars, Ebal, and Kitterman soils are either partially or totally formed in residuum from interbedded shale, sandstone, and siltstone. Branchville and Jubin soils either partially or totally formed in colluvial materials below the bluffs. Thin and discontinuous beds of gray limestone and yellowish brown silty limestone make up 10 percent of the unit. This unit caps many hills in the eastern part of the county, is found on lower valley walls in the central part, and extends westward beneath younger rocks. The lower part of the Ryker soils formed in clayey residuum and is underlain with limestone. All these soils are in areas of the Mississippian bedrocks.

The youngest bedrock unit in Perry County is of Pennsylvanian age. This unit is at least 250 feet thick and is composed of a wide variety of rock types. About 40 percent are made up of fine grained, evenly layered sandstone that weathers into slabs. Irregularly layered sandstone, which makes up about 15 percent of the unit, forms prominent bluffs in a few places, such as the bluffs along the Ohio River just east of Cannelton. In a few places these bluff-forming sandstones contain scattered small quartz pebbles and thin layers of pebbly sandstone. Gray mudstone, a rock similar to shale, but which weathers more rapidly than shale and is not so prominently layered, makes up 20 percent. Gray, smooth, plastic clay comprises 10 percent, and gray shale, which is in early stages of weathering, breaks into small rodlike fragments, makes up 10 percent. The remaining 5 percent consists of principally a few coal beds that in places are as much as 4 feet thick and have scattered thin ledges of low-grade sedimentary iron ore. None of the individual beds in this unit extend over an area of more than a few square miles. In the western part of the county, Pennsylvanian rocks are widespread but cap only the highest hills along the eastern line. As originally deposited, the sedimentary beds were flat and nearly horizontal, and their present branching or leaflike pattern on the map is a result of uplifting, tilting, and erosion. The uplift made it possible for erosion to shape the ground surface; the slight westward tilting brought older beds to the surface in the eastern part of the county and left the younger rocks principally in the western part. Adyeville, Apalona, Deuchars, Tipsaw, and Wellston soils are formed in residuum from interbedded sandstone shale and siltstone. All these soils are in areas of the Pennsylvanian bedrocks.

For many millions of years wind and water shaped the rocks of Perry County, so that when the glaciers first advanced into northern Indiana during the Pleistocene era, the landscape of most of the county looked similar to the present landscape. Before the advance of the glaciers there was no Ohio River as we now know it. The area now drained by the upper Ohio was, in pre-glacial time, drained by a large stream that flowed westward across northern Indiana—the River Teays. The stream that occupied the valley in which the Ohio now flows past Perry County, probably was an extension of the Blue River of Crawford, Harrison, and Washington Counties. One of the early glacial advances greatly changed this drainage pattern; ice blocked the valley in northern Indiana, and water from western Pennsylvania, West Virginia, and eastern Kentucky spilled around the southern margin of the glacier. Finding a low spot southwest of Louisville, Kentucky, this stream, swollen with glacial meltwater, poured into the present Ohio Valley. Thus established, the Ohio River collected and carried off great quantities of meltwater from each of the later glacial advances. Even between glaciations it was a large stream, draining about the same area that it does today.

The unconsolidated deposits of Perry County record at least two episodes of valley filling, separated by an interval of erosion, and it is likely that each depositional phase is associated with one of the major glacial advances. These relatively young deposits are all of sedimentary origin. Some were laid down by the Ohio River or by smaller streams; others were deposited in temporary lakes or swamps; still others were dropped by the wind. In a few places, as along the flood plain of the Ohio River, deposition continues now as in the past, though probably at a much slower rate. Stream-deposited clayey sands and silts represent the earlier of the two recognized phases of valley filling. This unit appears at the surface only along the upper courses of the Anderson River and its branches, where it is expressed as low terraces that are remnants of deposits that once filled the entire width of the valleys to the level at which they are now found. Along the valley of the Ohio River are extensive areas underlain by sand, silt, and gravel. Records of wells at Troy and Cannelton show that this deposit is about 150 feet thick and extends to the bottom of the bedrock valley. Earlier valley fill either was swept away before the second fill was deposited, or was indistinguishable in the few available drill holes. The typical surface form of this unit is a low, gently rounded terrace, the crest of which is about 20 feet above the present flood plain, or 60 feet above the normal river level. The sands and gravel are not deeply weathered. The gravel consists of numerous pebbles of granite and other rocks unknown in Indiana except from deposits of the glaciers. These sediments record the passage of great quantities of glacial meltwater from the latest (Wisconsin age) glacier down the valley floor of the Ohio. Deposits of these sands, silts, and clays blocked and ponded all stream tributaries to the Ohio River, and long, narrow, shallow lakes formed depositing bluish gray silts and clays. Remnants of these deposits are now present as flat-topped, sharp-edged terraces along the Anderson River, Middle Fork, Deer Creek, Poison Creek, Oil Creek, and their tributaries. These deposits are often called “blue mud” and extend to bedrock at a depth of about 150 feet near Troy, 70 feet at St. Meinrad in northern Spencer County, and 60 feet near Bristow. Elkinsville, Ginat, Hatfield, Millstone, and Sciotoville are soils that formed in old alluvial valley fill. Hartz, Lauer, Markland, McGary, Percell, Shircliff, and Zipp soils formed in sediments deposited in shallow lakes that generally were covered with a layer of loess.

The youngest geologic unit is the stream-deposited sand, silt, clay, and muck group. Along the Ohio River, deposits are mostly sand and silt, but along the smaller streams silt, clay, and gravelly modifiers of these textures are more common. Stream deposition began as the last glacier receded and continues slowly today, as evidenced by the thin depositional crust that is left behind by each bank overflow. Combs, Huntington, McAdoo, Newark, Petrolia, Rahm, and Woodmere soils formed in stream deposits and these soils are dominant along the Ohio River. Bonnie, Cuba, Gatchel, Haymond, Stendal, Wakeland, Wilbur, and Wirt soils formed in stream deposits and are dominant along smaller stream tributaries throughout the county.

Much of Perry County is covered with a few inches to a few feet of wind-deposited silt called loess. The age of this material is difficult to determine. In general, the loess cover is thicker over older sediments or rocks and thinner over younger materials, thicker over flat areas and thinner on slopes, and lacking altogether on steep and rocky hillsides, thicker in the southwest part of the county and thinner to the north and east. At least 15 feet of loess covers the hilltops just east of Troy. Alford, Hosmer, and Rickert soils formed in 80 inches or more of loess. In most other parts of the county, however, the maximum thickness is 2 to 4 feet. Apalona, Deuchars, Percell, and Tobinsport are examples of soils where the upper part is formed in loess, and the lower part in one or more other types of parent material. Along the edges of the Ohio River valley, a small area of dune sand is deposited in which Alvin and Bloomfield soils formed.

Climate

Climate largely determines the kind of plant and animal life on and in the soil. It also determines the amount of water available for the weathering of minerals and the translocation of soil material. Temperature determines the rate of chemical reactions in the soil. These effects tend to be uniform in relatively small areas, such as those the size of a county.

The climate in Perry County is generally cool and moist in winter and hot and humid in summer. It is presumably similar to the one that prevailed when the soils formed. The climate is nearly uniform throughout the county, and thus differences among the soils in the county are not the result of varied climatic conditions.

Plant and Animal Life

Plants have been one of the principal organisms influencing the soils in Perry County. Bacteria, fungi, earthworms, and human activities also have affected the formation of the soils. The chief contribution of plant and animal life is the addition of organic matter and nitrogen to the soil. The kind of organic material in and on the soil depends on the kind of native plants that grew on the soil. The remains of these plants accumulated in the surface layer, decayed, and eventually became humus. The roots of the plants provided channels for the downward movement of water and air through the soil, and they added organic matter as they decayed. Bacteria and soil micro-organisms helped to break down the organic matter into plant nutrients.

The native vegetation in Perry County was mainly deciduous, mixed hardwoods. Differences in natural soil drainage and minor variations in the kind of parent material affected the composition of the forest species. Common trees on well drained soils, such as Elkinsville and Millstone soils, were yellow-poplar, white oak, red oak, hickory, elm, and sugar maple. Wet soils, such as Bonnie and Ginat soils, supported primarily sweetgum, pin oak, beech, and soft maple.

Relief

Relief, or topography, has had a marked effect on the soils in Perry County through its influence on natural soil drainage, erosion, runoff, plant cover, and soil temperature. Some soils formed in the same type of parent material differ mainly in drainage characteristics because of relief.

Runoff is most rapid on the steepest slopes. Water is temporarily ponded in the low, depressional areas. The greater the runoff rate, the greater the hazard of erosion.

Through its effect on aeration in the soil, drainage determines the major color of a soil. Water and air move freely through most well drained soils and slowly through very poorly drained soils. In Elkinsville soils and other soils that are well aerated, the iron and aluminum compounds that give most soils their color are reddish or brownish and are oxidized. Ginat and other poorly aerated soils that are saturated for long periods commonly are dominantly gray and have reddish and brownish masses in which iron has accumulated. The soils are gray because the iron compounds have been reduced or they have been removed from the profile.

Soils on west- and south-facing slopes generally have a warmer soil temperature than soils on north- and east-facing slopes.

Time

Generally, a long time is needed for the processes of soil formation to result in the formation of distinct soil horizons.

The soils in Perry County range from immature to mature. Alford soils and other soils that formed in loess and Apalona, Deuchars, and other soils that formed in loess over material weathered from bedrock, have been exposed to the soil-forming factors long enough for the development of distinct horizons. Haymond, Gatchel, and other soils that formed in recent alluvium, however, have not been in place long enough for this kind of development. Some steep soils, such as Tipsaw soils, have been exposed to the soil-forming factors for a long time but do not have distinct horizons. Most of the precipitation that has fallen on these soils has run off the surface and thus has not moved through the profile. Consequently, very little weathering of minerals or translocation of soil material has occurred.

Processes of Soil Formation

Several processes have been involved in the formation of the soils in Perry County. These processes are additions, such as organic matter; losses, or dissolution, transfer, and removal of compounds, such as calcium carbonates and bases; the liberation and translocation of silicate clay minerals; and transformation, such as reduction and transfer of iron or weathering of silicate clays. In most soils in the county, more than one of these processes have helped to differentiate soil horizons (Ruhe, 1956; Stevenson, 1982).

Some organic matter has accumulated in the surface layer of all of the soils in the county. The content of organic matter is low or moderately low in the soils in Perry County.

Carbonates and bases have been leached from the upper horizons of nearly all of the soils in the county. Leaching of carbonates and salts preceded the translocation of silicate clay minerals. Most of the carbonates and the salts have been leached from the A and B horizons of well drained soils. Even in the wet soils, some leaching is indicated by the absence of carbonates and by an acid soil reaction. Leaching of wet soils is slower because of a high water table or the slow movement of water through the profile (Simonson, 1959).

Clay accumulates in pores and on the faces of structural units along which water moves. The leaching of bases and the subsequent translocation of silicate clays are among the more important processes of horizon differentiation in the county. Dubois soils are examples of soils in which translocated silicate clay has accumulated in the Bt horizon.

Gleying, or the reduction and transfer of iron, has occurred in all of the very poorly drained to somewhat poorly drained soils. In these naturally wet soils, this process has significantly affected horizon differentiation. A gray subsoil indicates the reduction and redistribution of an iron either from the upper horizons to lower horizons, or by the removal of iron from the soil profile. Mottles (now referred to as redoximorphic features), which are in soil horizons that have been reduced, indicate the segregation of iron oxide (Birkeland, 1974; Birkeland, 1984; Buol and others, 1980; Franzmeier, 1997; Jenny, 1941).

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

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.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

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.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp. A flood plain landform. Extensive, marshy, or swampy, depressed areas of flood plains between natural levees and valley sides of terraces.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

Bench terrace. A raised, level or nearly level strip of

earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board one foot wide, one foot long, and one inch thick before finishing.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

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.

Cement rock. Shaly limestone used in the manufacture of cement.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clayey soil. Texture group consisting of silty clay, sandy clay, and clay soil textures.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from adjacent stands.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Clod. A compact, coherent mass of soil varying in size, usually produced by plowing, digging, or other mechanical means, especially when these operations are performed on soils that are either

too wet or too dry and usually formed by compression, or breaking off from a larger unit.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forest. Forestland capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

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.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

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.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A low mound, ridge, bank, or hill of loose, windblown, granular material (generally sand), either bare or covered with vegetation, capable of movement from place to place but always retaining its characteristic shape.

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.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Even aged. Refers to a stand of trees in which only small differences in age occur between the individuals. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

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.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flat. A general term for a level or nearly level surface or small area of land marked by little or no relief.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Flood plain step. An essentially flat, alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface frequently modified by scour and/or deposition. May occur individually or as a series of steps.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors

responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift. 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. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these;

(2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interdune. A relatively flat surface, whether sand-free or sand-covered, between dunes.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Texture group consisting of coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam soil textures.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Major land resource areas (MLRA). Geographically associated land resource areas designated by Arabic numbers and identified by a descriptive geographic name.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Microhigh. An area that is 2 to 12 inches higher than the adjacent microlow.

Microlow. An area that is 2 to 12 inches lower than the adjacent microhigh.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. 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, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

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.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Paleosol. A soil that formed on a landscape in the past with distinctive morphological features resulting from a soil-forming environment that no longer exists at the site. The former pedogenic process was either altered because of external environmental change or interrupted by burial.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Pararock fragments. Fragments of paralithic materials, having a diameter of 2 millimeters or more; for example, parachanners and paraflagstones.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	20 to 100 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains 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 or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size

of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quartzite, metamorphic. Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

Quartzite, sedimentary. Very hard but unmetamorphosed sandstone consisting chiefly of quartz grains.

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
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Restrictive layer. Generally, the thickness of the soil over a layer or layers within the soil that strongly inhibits the penetration of roots. Restriction means the incapability to support more than a few fine or very fine roots if depth from the soil surface and water state, other than the occurrence of frozen water, are not limiting. Restrictive layers can be restrictive either because of physical properties or chemical properties. Types of restrictive features are abrupt textural change, bedrock (lithic), bedrock (paralithic), densic material, duripan, fragipan, nitric, orststein, permafrost, petrocalcic, petroferric, petrogypsic, placic, plinthite, salic, strongly contrasting textural stratification, and sulfuric.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Texture group consisting of sand and loamy sand soil textures.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Scarp. An escarpment, cliff, or steep slope of some extent along the margin of a plateau, mesa, terrace, or structural bench. A scarp may be of any height.

Scribner's log rule. A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder slope. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate,

humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

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.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Level	0 to 1 percent
Nearly level	0 to 3 percent
Very gently sloping	1 to 3 percent
Gently sloping	2 to 6 percent
Moderately sloping	6 to 12 percent
Strongly sloping	12 to 18 percent
Moderately steep	18 to 25 percent
Steep	25 to 35 percent
Very steep	35 percent and higher

Classes for complex slopes are as follows:

Level	0 to 1 percent
Nearly level	0 to 3 percent
Gently undulating	1 to 4 percent
Undulating	1 to 8 percent
Gently rolling	4 to 10 percent
Rolling	4 to 16 percent
Hilly	10 to 30 percent
Steep	20 to 60 percent
Very steep	45 percent and higher

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.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in 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.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil quality. Soil quality is the fitness of a specific kind of soil to function within its surroundings, support plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A type of stream terrace, formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structural bench. A platform-like, nearly level to gently inclined erosional surface developed on resistant strata in areas where valleys are cut in alternating strong and weak layers with an essentially horizontal attitude. Structural benches are bedrock controlled, and in contrast to stream terraces, have no geomorphic implication of former, partial erosion cycles and base-level controls, nor do they represent a stage of flood-plain development following an episode of valley trenching.

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 wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons,

considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Understory. Any plants in a forest community that grow to a height of less than 5 feet.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Waterspreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

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.

Wind erodibility index. The potential annual wind erosion for a given soil under a given set of field conditions. This factor is expressed as the average annual soil loss in tons per acre per year from a field area that is isolated, unsheltered, wide bare, smooth, level, loose, and noncrusted.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Note: The tables in this publication are included for general reference only. They were current as of 2003. The data may have been revised or updated since that date. The most current information is available via the Electronic Field Office Technical Guide (eFOTG) National Web site, the NRCS Soil Data Mart Web site, or the NRCS Web Soil Survey.

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Saint Meinrad, Indiana)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	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-----	40.5	21.9	31.2	68	-14	51	2.98	1.45	4.30	5	4.0
February----	45.7	25.4	35.6	73	-6	80	3.00	1.38	4.39	5	3.3
March-------	57.5	35.6	46.5	81	11	257	4.55	2.44	6.41	8	1.3
April-------	68.4	44.7	56.5	86	24	500	4.38	2.29	6.22	7	0.0
May---------	77.2	52.9	65.1	90	32	773	4.52	2.69	6.16	8	0.0
June--------	84.9	61.7	73.3	95	44	999	3.52	1.94	4.92	6	0.0
July--------	87.6	65.6	76.6	98	50	1,135	4.69	2.63	6.51	7	0.0
August------	86.6	63.9	75.3	97	48	1094	4.07	2.43	5.54	5	0.0
September---	80.7	57.6	69.1	94	37	868	3.30	1.86	4.58	5	0.0
October-----	70.0	45.1	57.5	87	24	542	2.87	1.22	4.28	5	0.0
November----	57.3	37.0	47.1	79	14	255	3.85	2.30	5.23	7	0.4
December----	45.0	27.0	36.0	69	-3	85	3.52	1.76	5.04	6	1.8
Yearly:											
Average---	66.8	44.9	55.8	---	---	---	---	---	---	---	---
Extreme---	104	-22	---	99	-15	---	---	---	---	---	---
Total-----	---	---	---	---	---	6,638	45.25	38.36	51.57	74	10.8

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Saint Meinrad, Indiana)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 9	Apr. 20	May 7
2 years in 10 later than--	Apr. 3	Apr. 16	Apr. 30
5 years in 10 later than--	Mar. 23	Apr. 7	Apr. 18
First freezing temperature in fall:			
1 yr in 10 earlier than--	Oct. 25	Oct. 12	Oct. 4
2 yrs in 10 earlier than--	Nov. 31	Oct. 17	Oct. 9
5 yrs in 10 earlier than--	Nov. 11	Oct. 27	Oct. 17

Table 3.--Growing Season

(Recorded in the period 1961-90 at Saint Meinrad, Indiana)

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	209	185	160
8 years in 10	216	191	167
5 years in 10	231	202	182
2 years in 10	246	213	196
1 year in 10	254	219	204

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AbvD2	Adyeville-Wellston-Deuchars silt loams, 8 to 20 percent slopes, eroded	15,507	6.3
AbvD3	Adyeville-Wellston-Deuchars silt loams, 8 to 20 percent slopes, severely eroded	19,448	7.9
AccG	Adyeville-Tipsaw-Ebal complex, 20 to 50 percent slopes, very rocky	80,796	32.7
AcuF	Alford silt loam, 18 to 35 percent slopes	370	0.1
AfzG	Alvin-Tobinsport complex, 25 to 45 percent slopes	139	*
AgrA	Apalona silt loam, 0 to 2 percent slopes	134	*
AgrB	Apalona silt loam, 2 to 6 percent slopes	11,032	4.5
AgrC2	Apalona silt loam, 6 to 12 percent slopes, eroded	13,238	5.4
AgrC3	Apalona silt loam, 6 to 12 percent slopes, severely eroded	9,937	4.0
BkeC2	Bloomfield-Alvin complex, 6 to 15 percent slopes, eroded	604	0.2
BodAH	Bonnie silt loam, 0 to 1 percent slopes, frequently flooded, brief duration	379	0.2
BodAM	Bonnie silt loam, ponded, 0 to 1 percent slopes, frequently flooded, brief duration	29	*
CndAH	Combs loam, 0 to 2 percent slopes, frequently flooded, brief duration	311	0.1
CwaAH	Cuba silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	1,441	0.6
DduC2	Deuchars silt loam, 6 to 12 percent slopes, eroded	862	0.3
EabD2	Ebal-Deuchars-Kitterman complex, 12 to 24 percent slopes, eroded	25,299	10.2
EabD3	Ebal-Deuchars-Kitterman complex, 12 to 24 percent slopes, severely eroded	12,543	5.1
EemAQ	Elk silt loam, moderately wet substratum, 0 to 2 percent slopes, rarely flooded	1,191	0.5
EesA	Elkinsville-Millstone complex, 0 to 2 percent slopes	245	*
EesAQ	Elkinsville-Millstone complex, 0 to 2 percent slopes, rarely flooded	178	*
EesD2	Elkinsville-Millstone complex, 12 to 18 percent slopes, eroded	59	*
EesDQ	Elkinsville-Millstone complex, 12 to 18 percent slopes, eroded, rarely flooded	165	*
EesFQ	Elkinsville-Millstone complex, 18 to 40 percent slopes, rarely flooded	296	0.1
GacAW	Gatchel loam, 0 to 2 percent slopes, occasionally flooded, very brief duration	9,292	3.8
GhaA	Ginat silt loam, 0 to 1 percent slopes	601	0.2
HbhA	Hartz silt loam, 0 to 2 percent slopes	630	0.3
HcaA	Hatfield silt loam, 0 to 2 percent slopes	506	0.2
HcbAQ	Hatfield silty clay loam, 0 to 2 percent slopes, rarely flooded	142	*
HcgAH	Haymond silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	5,124	2.1
HcgAQ	Haymond silt loam, 0 to 2 percent slopes, rarely flooded	527	0.2
HsaB2	Hosmer silt loam, 2 to 6 percent slopes, eroded	223	*
HubAH	Huntington silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration	1,209	0.5
JoaA	Johnsburg silt loam, 0 to 2 percent slopes	34	*
JoeG	Jubin-Branchville-Rock outcrop complex, 20 to 50 percent slopes, very bouldery	2,319	0.9
LeaA	Lauer silt loam, 0 to 2 percent slopes	920	0.4
McgC2	Markland silt loam, 6 to 12 percent slopes, eroded	369	0.1
McnGQ	Markland silt loam, 18 to 50 percent slopes, rarely flooded	1,599	0.6
McpC3	Markland silty clay loam, 6 to 12 percent slopes, severely eroded	1,017	0.4
McuDQ	Markland silty clay loam, 12 to 25 percent slopes, severely eroded, rarely flooded	1,571	0.6
MhkAH	McAdoo silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration	1,576	0.6
MhuA	McGary silt loam, 0 to 2 percent slopes	905	0.4
MsbB	Millstone-Elkinsville complex, 2 to 6 percent slopes	487	0.2
MsbBQ	Millstone-Elkinsville complex, 2 to 6 percent slopes, rarely flooded	414	0.2
MsbC2	Millstone-Elkinsville complex, 6 to 12 percent slopes, eroded	206	*
MsbCQ	Millstone-Elkinsville complex, 6 to 12 percent slopes, eroded, rarely flooded	299	0.1
NbgAH	Newark silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration	342	0.1
PhwA	Percell silt loam, 0 to 2 percent slopes	244	*
PhwB2	Percell silt loam, 2 to 6 percent slopes, eroded	1,216	0.5
PkaAH	Petrolia silty clay loam, 0 to 1 percent slopes, frequently flooded, brief duration	127	*
PsmA	Princeton loam, 0 to 2 percent slopes	213	*
RatAH	Rahm silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration	489	0.2
RgvB	Rickert-Alford silt loams, 2 to 6 percent slopes	385	0.2
RgvC2	Rickert-Alford silt loams, 6 to 12 percent slopes, eroded	713	0.3
RgvC3	Rickert-Alford silt loams, 6 to 12 percent slopes, severely eroded	130	*
RgvD3	Rickert-Alford silt loams, 12 to 18 percent slopes, severely eroded	919	0.4
RtcB2	Ryker silt loam, 2 to 6 percent slopes, eroded	70	*
RtcC2	Ryker silt loam, 6 to 12 percent slopes, eroded	163	*
ScbA	Sciotoville silt loam, 0 to 2 percent slopes	478	0.2
ScbAQ	Sciotoville silt loam, 0 to 2 percent slopes, rarely flooded	225	*
ScdB	Sciotoville silt loam, 2 to 4 percent slopes	496	0.2
ScdBQ	Sciotoville silt loam, 2 to 4 percent slopes, rarely flooded	280	0.1
SfyB2	Shircliff silt loam, 2 to 6 percent slopes, eroded	1,309	0.5

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
StdAH	Stendal silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	1,542	0.6
TakC	Tapawingo silt loam, 2 to 12 percent slopes	181	*
TakD	Tapawingo silt loam, 12 to 20 percent slopes	355	0.1
TckA	Tobinsport silt loam, 0 to 2 percent slopes	249	0.1
TckB	Tobinsport silt loam, 2 to 4 percent slopes	295	0.1
Uaa	Udorthents, cut and filled	2,634	1.1
UabBK	Udipsamments sandy loam, 1 to 6 percent slopes, occasionally flooded, brief duration-	106	*
Uas	Udorthents-Pits, quarries complex	411	0.2
UddD	Urban land-Alford complex, 6 to 18 percent slopes	499	0.2
UehB	Urban land-Elkinsville-Hatfield complex, 0 to 6 percent slopes	784	0.3
UffY	Urban land, leveed	265	0.1
W	Water	2,662	1.1
WaaAH	Wakeland silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	1,545	0.6
WokAH	Wilbur silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	1,222	0.5
WprAH	Wirt loam, 0 to 2 percent slopes, frequently flooded, brief duration	912	0.4
WrlAH	Woodmere silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration-	835	0.3
ZcaA	Zipp silty clay, 0 to 1 percent slopes	417	0.2
	Total	246,886	100.0

*Less than 0.1 percent

Table 5.--Main Limitations and Hazards Affecting Cropland

(See text for a description of the limitations and hazards listed in this table. Only those soils that are suited for cultivated crops are listed in this table.)

Soil name and map symbol	Cropland limitations and hazards
AbvD2, AbvD3:	
Adyeville	Slope, depth to bedrock, low pH, water erosion, low available water capacity.
Wellston	Slope, low pH, crusting, water erosion, moderate available water capacity.
Deuchars	Slope, low pH, crusting, water erosion, moderate available water capacity.
AgrA:	
Apalona	Low pH, crusting, moderate available water capacity.
AgrB, AgrC2, AgrC3:	
Apalona	Low pH, crusting, water erosion, moderate available water capacity.
BkeC2:	
Bloomfield	Water erosion, wind erosion, low available water capacity.
Alvin	Low pH, water erosion.
BodAH:	
Bonnie	Flooding, ponding, wetness, low pH, crusting.
CndAH:	
Combs	Flooding.
CwaAH:	
Cuba	Flooding, low pH, crusting.
DduC2:	
Deuchars	Low pH, crusting, water erosion, moderate available water capacity.
EabD2:	
Ebal	Slope, low pH, crusting, water erosion, moderate available water capacity.
Deuchars	Slope, low pH, crusting, water erosion, moderate available water capacity.
Kitterman	Slope, wetness, depth to bedrock, low pH, water erosion, low available water capacity.
EabD3:	
Ebal	Slope, poor tilth, low pH, crusting, water erosion, moderate available water capacity.
Deuchars	Slope, low pH, crusting, water erosion, moderate available water capacity.
Kitterman	Slope, wetness, depth to bedrock, low pH, water erosion, low available water capacity.
EemAQ:	
Elk	Low pH, crusting.
EesA, EesAQ:	
Elkinsville	Low pH, crusting.
Millstone	Low pH, crusting.
EesD2, EesDQ:	
Elkinsville	Slope, low pH, water erosion.
Millstone	Slope, low pH, water erosion.

Table 5.--Main Limitations and Hazards Affecting Cropland--Continued

Soil name and map symbol	Cropland limitations and hazards
GacAW:	
Gatchel	Flooding, moderate available water capacity.
GhaA:	
Ginat	Ponding, wetness, low pH, crusting.
HbhA:	
Hartz	Wetness, low pH, crusting.
HcaA, HcbAQ:	
Hatfield	Wetness, low pH, crusting, moderate available water capacity.
HcgAH:	
Haymond	Flooding, crusting.
HcgAQ:	
Haymond	Crusting.
HsaB2:	
Hosmer	Low pH, crusting, water erosion, moderate available water capacity.
HubAH:	
Huntington	Flooding.
JoaA:	
Johnsburg	Wetness, low pH, moderate available water capacity.
LeaA:	
Lauer	Wetness, low pH.
McgC2:	
Markland	Crusting, water erosion.
McpC3:	
Markland	Crusting, water erosion, poor tilth.
McuDQ:	
Markland	Slope, poor tilth, crusting, water erosion.
MhkAH:	
McAdoo	Flooding, crusting.
MhuA:	
McGary	Wetness, crusting.
MsbB, MsbBQ, MsbC2, MsbCQ:	
Millstone	Low pH, water erosion, crusting.
Elkinsville	Low pH, water erosion, crusting.
NbgAH:	
Newark	Flooding, wetness, crusting.
PhwA:	
Percell	Low pH, crusting.
PhwB2:	
Percell	Low pH, crusting, water erosion.
PkaAH:	
Petrolia	Flooding, ponding, wetness, crusting.

Table 5.--Main Limitations and Hazards Affecting Cropland--Continued

Soil name and map symbol	Cropland limitations and hazards
PsmA: Princeton	Crusting.
RatAH: Rahm	Flooding, wetness, crusting.
RgvB, RgvC2, RgvC3: Rickert	Low pH, water erosion, crusting.
Alford	Low pH, water erosion, crusting.
RgvD3: Rickert	Slope, low pH, crusting, water erosion.
Alford	Slope, low pH, crusting, water erosion.
RtcB2, RtcC2: Ryker	Low pH, crusting, water erosion.
ScbA, ScbAQ: Sciotoville	Wetness, low pH, crusting, moderate available water capacity.
ScdB, ScdBQ: Sciotoville	Wetness, low pH, crusting, water erosion, moderate available water capacity.
SfyB2: Shircliff	Wetness, low pH, crusting, water erosion.
StdAH: Stendal	Flooding, wetness, low pH, crusting.
TakC: Tapawingo	Crusting, water erosion, low available water capacity.
TakD: Tapawingo	Slope, crusting, water erosion, low available water capacity.
TckA: Tobinsport	Low pH, crusting.
TckB: Tobinsport	Low pH, water erosion, crusting.
UabBK: Udipsamments	Flooding, water erosion, wind erosion, low available water capacity.
WaaAH: Wakeland	Flooding, wetness, crusting.
WokAH: Wilbur	Flooding, crusting.
WprAH: Wirt	Flooding, crusting.
WrlAH: Woodmere	Flooding, crusting.
ZcaA: Zipp	Ponding, wetness, moderate available water capacity, poor tilth.

Table 6.--Main Limitations and Hazards Affecting Pasture

(See text for a description of the limitations and hazards listed in this table. If a map unit is not listed, this indicates that it is generally not suited to hay or pasture. An asterisk (*) indicates that only some of the map unit is suited to hay or pasture.)

Map symbol and soil name	Pasture limitations and hazards
AbvD2, AbvD3:	
Adyeville	Equipment limitation, depth to bedrock, low pH, water erosion, low available water capacity.
Wellston	Equipment limitation, depth to bedrock, low pH, water erosion, moderate available water capacity.
Deuchars	Equipment limitation, low pH, water erosion, moderate available water capacity.
AcuF*:	
Alford	Equipment limitation, low pH, water erosion.
AgrA, AgrB, AgrC2, AgrC3:	
Apalona	Low pH, moderate available water capacity.
BkeC2:	
Bloomfield	Water erosion, wind erosion, low available water capacity, low pH.
Alvin	Low pH, water erosion.
BodAH:	
Bonnie	Flooding, ponding, wetness, low pH.
CndAH:	
Combs	Flooding.
CwaAH:	
Cuba	Flooding, low pH.
DduC2:	
Deuchars	low pH, water erosion, moderate available water capacity.
EabD2, EabD3:	
Ebal	Equipment limitation, low pH, water erosion, moderate available water capacity.
Deuchars	Equipment limitation, low pH, water erosion, moderate available water capacity.
Kitterman	Equipment limitation, depth to bedrock, low pH, water erosion, low available water capacity.
EemAQ:	
Elk	Low pH.
EesA, EesAQ:	
Elkinsville	Low pH
Millstone	Low pH.
EesD2, EesDQ, EesFQ*:	
Elkinsville	Equipment limitation, low pH, water erosion.
Millstone	Equipment limitation, low pH, water erosion.
GacAW:	
Gatchel	Flooding, moderate available water capacity.
GhaA:	
Ginat	Wetness, ponding, low pH.

Table 6.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Pasture limitations and hazards
HbhA:	
Hartz	Low pH.
HcaA, HcbAQ:	
Hatfield	Low pH, moderate available water capacity.
HcgAH:	
Haymond	Flooding.
HcgAQ:	
Haymond	None.
HsaB2:	
Hosmer	Low pH, water erosion, moderate available water capacity.
HubAH:	
Huntington	Flooding.
JoaA:	
Johnsburg	Low pH, moderate available water capacity.
LeaA:	
Lauer	Low pH.
McgC2, McpC3:	
Markland	Water erosion.
McuDQ:	
Markland	Equipment limitation, water erosion.
MhkAH:	
McAdoo	Flooding.
MhuA:	
McGary	Low pH.
MsbB, MsbBQ, MsbC2, MsbCQ:	
Millstone	Low pH, water erosion.
Elkinsville	Low pH, water erosion.
NbgAH:	
Newark	Flooding.
PhwA:	
Percell	Low pH.
PhwB2:	
Percell	Low pH, water erosion.
PkaAH:	
Petrolia	Flooding, ponding, wetness.
PsmA:	
Princeton	Low pH.
RatAH:	
Rahm	Flooding.
RgvB, RgvC2, RgvC3:	
Rickert	Low pH, water erosion.
Alford	Low pH, water erosion.

Table 6.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Pasture limitations and hazards
RgvD3:	
Rickert	Equipment limitation, low pH, water erosion.
Alford	Equipment limitation, low pH, water erosion.
RtcB2, RtcC2:	
Ryker	Low pH, water erosion.
ScbA, ScbAQ:	
Sciotoville	Low pH.
ScdB, ScdBQ:	
Sciotoville	Low pH, water erosion, moderate available water capacity.
SfyB2:	
Shircliff	Low pH, water erosion.
StdAH:	
Stendal	Flooding, low pH.
TakC:	
Tapawingo	Water erosion, low available water capacity.
TakD:	
Tapawingo	Equipment limitation, water erosion, low available water capacity.
TckA:	
Tobinsport	Low pH.
TckB:	
Tobinsport	Low pH, water erosion.
UabBK:	
Udipsamments	Flooding, water erosion, wind erosion, low available water capacity.
WaaAH:	
Wakeland	Flooding.
WokAH:	
Wilbur	Flooding.
WprAH:	
Wirt	Flooding.
WrlAH:	
Woodmere	Flooding.
ZcaA:	
Zipp	Ponding, wetness, moderate available water capacity.

Table 7.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-red clover hay	Tall fescue-ladino
		Bu	Bu	Bu	Tons	AUM*
AbvD2:						
Adyeville, Wellston, Deuchars	4e	61	22	24	2.0	4.0
AbvD3:						
Adyeville, Wellston, Deuchars	6e	41	14	16	1.8	3.6
AccG:						
Adyeville, Tipsaw	7e					
Ebal	6e	---	---	---	---	---
AcuF:						
Alford	6e	---	---	---	2.0	4.0
AfzG:						
Alvin, Tobinsport	7e	---	---	---	---	---
AgrA:						
Apalona	2w	95	33	43	3.1	6.3
AgrB:						
Apalona	2e	95	33	43	3.1	6.3
AgrC2:						
Apalona	3e	80	28	36	2.6	5.3
AgrC3:						
Apalona	4e	75	26	34	2.5	5.0
BkeC2:						
Bloomfield, Alvin	3e	66	23	30	2.2	4.4
BodAH:						
Bonnie	3w	110	39	---	---	---
BodAM:						
Bonnie	7w	---	---	---	---	---
CndAH:						
Combs	2w	100	35	---	---	---
CwaAH:						
Cuba	2w	110	38	---	---	---
DduC2:						
Deuchars	3e	100	35	40	3.3	6.6
EabD2:						
Ebal, Deuchars, Kitterman	4e	52	13	23	1.7	3.5
EabD3:						
Ebal, Deuchars, Kitterman	6e	20	7	9	1.3	2.6

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-red clover hay	Tall fescue-ladino
		Bu	Bu	Bu	Tons	AUM*
EemAQ:						
Elk	1	120	42	48	4.0	8.0
EesA, EesAQ:						
Elkinsville, Millstone--	1	118	41	47	3.9	7.8
EesD2, EesDQ:						
Elkinsville, Millstone--	4e	88	31	35	2.9	5.9
EesFQ:						
Elkinsville, Millstone--	7e	---	---	---	---	---
GacAW:						
Gatchel	3w	70	25	28	2.3	4.6
GhaA:						
Ginat	3w	140	49	56	4.6	9.2
HbhA:						
Hartz	2w	135	47	54	4.5	9.0
HcaA, HcbAQ:						
Hatfield	2w	120	42	48	4.0	8.0
HcgAH:						
Haymond	2w	120	42	---	---	---
HcgAQ:						
Haymond	1	130	46	52	4.3	8.6
HsaB2:						
Hosmer	2w	90	32	41	3.0	6.0
HubAH:						
Huntington	2w	125	44	---	---	---
JoaA:						
Johnsburg	2w	100	35	45	3.3	6.6
JoeG:						
Jubin, Branchville	7e	---	---	---	---	---
LeaA:						
Lauer	2w	135	47	54	4.3	8.6
McgC2:						
Markland	4e	70	25	32	2.3	4.6
McnGQ:						
Markland	7e	---	---	---	---	---
McpC3:						
Markland	6e	60	21	27	2.0	4.0
McuDQ:						
Markland	7e	---	---	---	1.0	2.0
MhkAH:						
McAdoo	2w	115	40	---	---	---

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-red clover hay	Tall fescue-ladino
		Bu	Bu	Bu	Tons	AUM*
MhuA:						
McGary	3w	100	35	45	3.3	6.6
MsbB, MsbBQ:						
Millstone, Elkinsville	2e	116	41	46	3.8	7.7
MsbC2, MsbCQ:						
Millstone, Elkinsville	3e	102	36	41	3.4	6.8
NbgAH:						
Newark	2w	125	44	---	---	---
PhwA:						
Percell	1	125	44	50	4.1	8.2
PhwB2:						
Percell	2e	120	42	48	4.0	8.0
PkaAH:						
Petrolia	3w	125	44	---	---	---
PsmA:						
Princeton	1	100	35	45	3.3	6.6
RatAH:						
Rahm	2w	120	42	---	---	---
RgvB:						
Rickert, Alford	2e	120	42	48	4.0	8.0
RgvC2:						
Rickert, Alford	3e	105	37	42	3.5	6.9
RgvC3:						
Rickert, Alford	4e	100	35	40	3.3	6.6
RgvD3:						
Rickert, Alford	6e	85	30	34	2.8	5.6
RtcB2:						
Ryker	2e	115	40	46	3.8	7.6
RtcC2:						
Ryker	3e	110	37	44	3.5	7.0
ScbA, ScbAQ:						
Sciotoville	2w	95	33	43	3.1	6.2
ScdB, ScdBQ:						
Sciotoville	2e	95	33	43	3.1	6.2
SfyB2:						
Shircliff	3e	80	28	36	2.6	5.3
StdAH:						
Stendal	2w	120	42	---	---	---
TakC:						
Tapawingo	3e	45	16	20	1.5	3.0

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-red clover hay	Tall fescue-ladino
		Bu	Bu	Bu	Tons	AUM*
TakD:						
Tapawingo	4e	30	11	14	1.0	2.0
TckA:						
Tobinsport	1	120	42	48	3.8	7.6
TckB:						
Tobinsport	2e	120	42	48	3.8	7.6
Uaa.						
Udorthents						
UabBK:						
Udipsamments	3w	55	19	25	1.8	3.6
Uas:						
Udorthents	8s	---	---	---	---	---
UddD.						
Urban land, Alford						
UehB.						
Urban land, Elkinsville, Hatfield						
UffY.						
Urban land						
W.						
Water						
WaaAH:						
Wakeland	2w	120	42	---	---	---
WokAH:						
Wilbur	2w	120	42	---	---	---
WprAH:						
Wirt	2w	95	33	---	---	---
WrlAH:						
Woodmere	2w	115	40	---	---	---
ZcaA:						
Zipp	3w	105	37	42	3.4	6.8

*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 8.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

Map symbol	Soil name
AgrA	Apalona silt loam, 0 to 2 percent slopes
AgrB	Apalona silt loam, 2 to 6 percent slopes
BodAH	Bonnie silt loam, 0 to 1 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
CndAH	Combs loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
CwaAH	Cuba silt loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
EemAQ	Elk silt loam, moderately wet substratum, 0 to 2 percent slopes, rarely flooded
EesA	Elkinsville-Millstone complex, 0 to 2 percent slopes
EesAQ	Elkinsville-Millstone complex, 0 to 2 percent slopes, rarely flooded
GacAW	Gatchel loam, 0 to 2 percent slopes, occasionally flooded, very brief duration
GhaA	Ginat silt loam, 0 to 1 percent slopes (where drained)
HbhA	Hartz silt loam, 0 to 2 percent slopes
HcaA	Hatfield silt loam, 0 to 2 percent slopes (where drained)
HcbAQ	Hatfield silty clay loam, 0 to 2 percent slopes, rarely flooded (where drained)
HcgAH	Haymond silt loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
HcgAQ	Haymond silt loam, 0 to 2 percent slopes, rarely flooded
HsaB2	Hosmer silt loam, 2 to 6 percent slopes, eroded
HubAH	Huntington silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
JoaA	Johnsburg silt loam, 0 to 2 percent slopes (where drained)
LeaA	Lauer silt loam, 0 to 2 percent slopes (where drained)
MhkAH	McAdoo silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
MhuA	McGary silt loam, 0 to 2 percent slopes (where drained)
MsbB	Millstone-Elkinsville complex, 2 to 6 percent slopes
MsbBQ	Millstone-Elkinsville complex, 2 to 6 percent slopes, rarely flooded
NbgAH	Newark silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
PhwA	Percell silt loam, 0 to 2 percent slopes
PhwB2	Percell silt loam, 2 to 6 percent slopes, eroded
PkaAH	Petrolia silty clay loam, 0 to 1 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
PsmA	Princeton loam, 0 to 2 percent slopes
RatAH	Rahm silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
RgvB	Rickert-Alford silt loams, 2 to 6 percent slopes
RtcB2	Ryker silt loam, 2 to 6 percent slopes, eroded
ScbA	Sciotoville silt loam, 0 to 2 percent slopes
ScbAQ	Sciotoville silt loam, 0 to 2 percent slopes, rarely flooded
ScdB	Sciotoville silt loam, 2 to 4 percent slopes
ScdBQ	Sciotoville silt loam, 2 to 4 percent slopes, rarely flooded
SfyB2	Shircliff silt loam, 2 to 6 percent slopes, eroded
StdAH	Stendal silt loam, 0 to 2 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
TckA	Tobinsport silt loam, 0 to 2 percent slopes
TckB	Tobinsport silt loam, 2 to 4 percent slopes
WaaAH	Wakeland silt loam, 0 to 2 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
WokAH	Wilbur silt loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
WprAH	Wirt loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
WrlAH	Woodmere silty clay loam, 0 to 2 percent slopes, frequently flooded, brief duration (where protected from flooding or not frequently flooded during the growing season)
ZcaA	Zipp silty clay, 0 to 1 percent slopes (where drained)

Table 9.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
AbvD2:					
Adyeville	American cranberrybush, black chokeberry, common juniper, elderberry, silky dogwood.	Hazelnut, roughleaf dogwood, smooth sumac, staghorn sumac.	Washington hawthorn, northern whitecedar.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
Wellston	American cranberrybush, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, hackberry, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Deuchars	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
AbvD3:					
Adyeville	American cranberrybush, elderberry, silky dogwood.	Blackhaw, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, hackberry, serviceberry.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
Wellston	American cranberrybush, black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry, pin oak.	Eastern cottonwood, imperial Carolina poplar.
Deuchars	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, chinkapin oak, common serviceberry, eastern redcedar, northern whitecedar.	Norway spruce, Virginia pine, black oak, blackgum, chinkapin oak, green ash, hackberry.	Eastern cottonwood, imperial Carolina poplar.
AccG:					
Adyeville	American cranberrybush, black chokeberry, common juniper, elderberry, silky dogwood.	Hazelnut, roughleaf dogwood, smooth sumac, staghorn sumac.	Washington hawthorn, northern whitecedar.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
AccG:					
Tipsaw----------	American cranberrybush, black chokeberry, common juniper, elderberry, silky dogwood.	Hazelnut, roughleaf dogwood, smooth sumac, staghorn sumac.	Washington hawthorn, northern whitecedar.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
Ebal----------	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
AcuF:					
Alford----------	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
AfzG:					
Alvin----------	American cranberrybush, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, hackberry, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Tobinsport------	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
AgrA, AgrB, AgrC2, AgrC3:					
Apalona---------	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
BkeC2:					
Bloomfield	American cranberrybush, elderberry, silky dogwood.	Blackhaw, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, hackberry, serviceberry.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
Alvin	American cranberrybush, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, hackberry, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
BodAH:					
Bonnie	American cranberrybush, black chokeberry, buttonbush, common ninebark, common winterberry, elderberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Rockspur hawthorne, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
BodAM.					
Bonnie					
CndAH:					
Combs	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
CwaAH:					
Cuba	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
DduC2:					
Deuchars	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
EabD2:					
Ebal	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Deuchars	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Kitterman	American cranberrybush, black chokeberry, common juniper, elderberry, silky dogwood.	Hazelnut, roughleaf dogwood, smooth sumac, staghorn sumac.	Washington hawthorn, northern whitecedar.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
EabD3:					
Ebal	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, chinkapin oak, common serviceberry, eastern redcedar, northern whitecedar.	Norway spruce, Virginia pine, black oak, blackgum, chinkapin oak, green ash, hackberry.	Eastern cottonwood, imperial Carolina poplar.
Deuchars	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, chinkapin oak, common serviceberry, eastern redcedar, northern whitecedar.	Norway spruce, Virginia pine, black oak, blackgum, chinkapin oak, green ash, hackberry.	Eastern cottonwood, imperial Carolina poplar.
Kitterman	American cranberrybush, elderberry, silky dogwood.	Blackhaw, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, hackberry, serviceberry.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
EemAQ:					
Elk	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
EesA, EesAQ, EesD2, EesDQ, EesFQ:					
Elkinsville	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Millstone	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
GacAW:					
Gatchel	American cranberrybush, black chokeberry, common juniper, elderberry, silky dogwood.	Hazelnut, roughleaf dogwood, smooth sumac, staghorn sumac.	Washington hawthorn, northern whitecedar.	Virginia pine, blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
GhaA:					
Ginat	American cranberrybush, black chokeberry, buttonbush, common ninebark, common winterberry, elderberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Cockspur hawthorne, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
HbhA:					
Hartz	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
HcaA, HcbAQ:					
Hatfield	American cranberrybush, Canada yew, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood, southern arrowwood, witchhazel.	Shingle oak, Washington hawthorn, eastern redcedar, northern whitecedar.	Norway spruce, baldcypress, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak.	Eastern cottonwood, imperial Carolina poplar.
HcgAH:					
Haymond	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
HcgAQ:					
Haymond	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
HsaB2:					
Hosmer	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
HubAH:					
Huntington	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
JoaA:					
Johnsburg	American cranberrybush, Canada yew, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood, southern arrowwood, witchhazel.	Shingle oak, Washington hawthorn, eastern redcedar, northern whitecedar.	Norway spruce, baldcypress, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak.	Eastern cottonwood, imperial Carolina poplar.
JoeG:					
Jubin	American cranberrybush, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, hackberry, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Branchville	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Rock outcrop.					
LeaA:					
Lauer	American cranberrybush, Canada yew, black chokeberry, common juniper, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood, southern arrowwood, witchhazel.	Shingle oak, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
McgC2, McnGQ:					
Markland	American cranberrybush, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, hackberry, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
McpC3, McuDQ:					
Markland	American cranberrybush, black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry, pin oak.	Eastern cottonwood, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
MhkAH:					
McAdoo----------	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
MhuA:					
McGary----------	American cranberrybush, Canada yew, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood, southern arrowwood, witchhazel.	Shingle oak, Washington hawthorn, eastern redcedar, northern whitecedar.	Norway spruce, baldcypress, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak.	Eastern cottonwood, imperial Carolina poplar.
MsbB, MsbBQ, MsbC2, MsbCQ:					
Millstone-------	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Elkinsville-----	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
NbgAH:					
Newark----------	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, Washington hawthorn, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
PhwA, PhwB2:					
Percell	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
PkaAH:					
Petrolia	American cranberrybush, black chokeberry, buttonbush, common ninebark, common winterberry, elderberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Cockspur hawthorne, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
PsmA:					
Princeton	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
RatAH:					
Rahm	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, Washington hawthorn, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
RgvB, RgvC2:					
Rickert	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Alford	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
RgvC3, RgvD3:					
Rickert	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, pin oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Alford	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, pin oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
RtcB2, RtcC2:					
Ryker	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
ScbA, ScbAQ, ScdB, ScdBQ: Sciotoville	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
SfyB2: Shircliff	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
StdAH: Stendal	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, Washington hawthorn, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
TakC, TakD. Tapawingo					
TckA, TckB: Tobinsport	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Uaa. Udorthents					
UabBK: Udipsamments	American cranberrybush, black chokeberry, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, northern whitecedar.	Blackgum, bur oak, green ash, hackberry, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
Uas: Udorthents.					
Pits, quarries.					

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
UddD: Urban land.					
Alford	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
UehB: Urban land.					
Elkinsville	American cranberrybush, black chokeberry, common juniper, common ninebark, common winterberry, coralberry, elderberry, gray dogwood, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, eastern redcedar, hackberry, northern whitecedar, red pine, serviceberry.	Norway spruce, baldcypress, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Hatfield	American cranberrybush, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, eastern redcedar, northern whitecedar, serviceberry.	Norway spruce, Virginia pine, black oak, blackgum, green ash, hackberry.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
UffY. Urban land					
W. Water					
WaaAH: Wakeland	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Cockspur hawthorne, common pawpaw, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, Washington hawthorn, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, red maple, swamp chestnut oak, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
WokAH:					
Wilbur	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
WprAH:					
Wirt	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
WrlAH:					
Woodmere	American cranberrybush, black chokeberry, common ninebark, common winterberry, elderberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Shingle oak, Washington hawthorn, cockspur hawthorne, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
ZcaA:					
Zipp	American cranberrybush, black chokeberry, buttonbush, common ninebark, common winterberry, elderberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood.	Cockspur hawthorne, hazel alder, nannyberry, roughleaf dogwood.	Shingle oak, hackberry, northern whitecedar.	Norway spruce, baldcypress, blackgum, green ash, pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 10.--Forestland Management and Productivity

(Only the soils suitable for production of commercial trees are listed.)

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
AbvD2:										
Adyeville	3R	Moderate	Moderate	Moderate	Moderate	Moderate	Northern red oak	64	43	Black oak, bur oak, green ash, eastern white pine, northern red oak, tuliptree, white ash, white oak.
Wellston	4A	Moderate	Slight	Slight	Slight	Severe	Northern red oak	81	57	Black cherry, black walnut, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
							Tuliptree	90	86	
							Virginia pine	70	114	
							Sugar maple	---	---	
							Black cherry	---	---	
							White ash	---	---	
							Black walnut	---	---	
							White oak	---	---	
Deuchars	5A	Moderate	Slight	Slight	Slight	Moderate	Northern red oak	90	72	Black walnut, black cherry, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
AbvD3:										
Adyeville	3R	Moderate	Moderate	Moderate	Moderate	Moderate	Northern red oak	64	43	Virginia pine, black oak, bur oak, eastern white pine, green ash, northern red oak, tuliptree, white oak.
Wellston	4A	Moderate	Slight	Slight	Slight	Severe	Northern red oak	81	57	Black oak, chinkapin oak, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
							Tuliptree	90	86	
							Virginia pine	70	114	
							Sugar maple	---	---	
							Black walnut	---	---	
							White ash	---	---	
							Black cherry	---	---	
							White oak	---	---	

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
AbvD3:										
Deuchars	5A	Moderate	Slight	Slight	Slight	Moderate	Northern red oak	90	72	Black oak, chinkapin oak, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
AccG:										
Adyeville	3R	Severe	Severe	Moderate	Moderate	Moderate	Northern red oak	64	43	Virginia pine, black oak, bur oak, eastern white pine, green ash, northern red oak, tuliptree, white oak.
Tipsaw	4R	Severe	Severe	Severe	Slight	Moderate	Northern red oak	70	57	Virginia pine, black oak, eastern white pine, green ash, northern red oak, tuliptree, bur oak, white oak.
							Virginia pine	70	114	
							Black oak	70	57	
Ebal	4R	Severe	Moderate	Moderate	Moderate	Moderate	Black oak	80	57	Eastern white pine, black oak, green ash, northern red oak, white ash, tuliptree, white oak.
							Northern red oak	---	---	
							Tuliptree	---	---	
AcuF:										
Alford	8R	Severe	Moderate	Slight	Slight	Severe	Tuliptree	105	114	Black walnut, eastern white pine, northern red oak, tuliptree, white ash, white oak, black cherry.
							Northern red oak	---	---	
AfzG:										
Alvin	4R	Severe	Severe	Slight	Slight	Moderate	Northern red oak	80	57	Black walnut, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak, black cherry.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
AfzG:										
Tobinsport-----	8R	Severe	Severe	Slight	Slight	Severe	Tuliptree----------	101	114	Black cherry,
							Northern red oak----	---	---	black walnut,
							Black oak----------	---	---	eastern white
										pine, green
										ash, northern
										red oak,
										tuliptree,
										white ash,
										white oak.
AgrA, AgrB:										
Apalona--------	5D	Slight	Slight	Slight	Moderate	Severe	Tuliptree----------	80	72	Black oak,
							White oak----------	60	43	eastern white
							Black oak----------	60	43	pine, northern
										red oak, green
										ash,
										tuliptree,
										white ash,
										white oak.
AgrC2:										
Apalona--------	5D	Slight	Slight	Slight	Moderate	Moderate	Tuliptree----------	80	72	Black oak,
							White oak----------	60	43	eastern white
							Black oak----------	60	43	pine, northern
										red oak, green
										ash,
										tuliptree,
										white ash,
										white oak.
AgrC3:										
Apalona--------	5D	Slight	Slight	Moderate	Moderate	Moderate	Tuliptree----------	80	72	Virginia pine,
							White oak----------	60	43	black oak,
							Black oak----------	60	43	eastern white
										pine, scarlet
										oak, white oak,
										green ash.
BkeC2:										
Bloomfield-----	4S	Slight	Slight	Moderate	Slight	Slight	Black oak----------	70	57	Shingle oak,
							Scarlet oak---------	---	---	Virginia pine,
							White oak----------	---	---	bur oak,
							Shagbark hickory----	---	---	black oak,
										eastern
										redcedar,
										eastern white
										pine, white
										oak.
Alvin----------	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	90	72	Black walnut,
										eastern white
										pine, green
										ash, northern
										red oak,
										tuliptree,
										white ash,
										white oak,
										black cherry.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
BodAH, BodAM:										
Bonnie	5W	Slight	Severe	Severe	Severe	Severe	Pin oak	90	72	Baldcypress, blackgum, bur oak, overcup oak, pin oak, red maple, swamp white oak, sweetgum.
							Eastern cottonwood	100	129	
							Cherrybark oak	---	---	
							American sycamore	---	---	
							Sweetgum	---	---	
CndAH:										
Combs	5A	Slight	Slight	Slight	Slight	Severe	Northern red oak	90	72	Shumard's oak, cherrybark oak, swamp chestnut oak, green ash, bur oak, white ash, tuliptree.
							Tuliptree	115	129	
							White oak	---	---	
							Black walnut	---	---	
							American sycamore	---	---	
CwaAH:										
Cuba	8A	Slight	Moderate	Slight	Slight	Severe	Tuliptree	100	114	Swamp chestnut oak, Shumard's oak, cherrybark oak, bur oak, green ash, tuliptree, white ash.
DduC2:										
Deuchars	5A	Slight	Slight	Slight	Slight	Severe	Northern red oak	90	72	Black walnut, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak, black cherry, cherrybark oak.
EabD2:										
Ebal	4R	Moderate	Moderate	Moderate	Slight	Moderate	Black oak	80	57	Scarlet oak, black oak, green ash, northern red oak, tuliptree, white oak.
							Northern red oak	---	---	
							Tuliptree	---	---	
Deuchars	5R	Moderate	Moderate	Moderate	Slight	Severe	Northern red oak	90	72	Black walnut, black cherry, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
EabD2:										
Kitterman------	3C	Moderate	Moderate	Moderate	Moderate	Moderate	Black oak---------- Tuliptree---------- White oak---------- Sweetgum----------	65 90 57 ---	43 86 43 ---	Virginia pine, black oak, scarlet oak, tuliptree, white oak, white pine, bur oak, black gum.
EabD3:										
Ebal----------	4R	Moderate	Moderate	Moderate	Slight	Moderate	Black oak---------- Northern red oak---- Tuliptree----------	80 --- ---	57 --- ---	Scarlet oak, black oak, green ash, northern red oak, tuliptree, white oak, Virginia pine.
Deuchars-------	5R	Moderate	Moderate	Moderate	Slight	Severe	Northern red oak----	90	72	Black oak, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
Kitterman------	3C	Moderate	Moderate	Moderate	Moderate	Moderate	Black oak---------- Tuliptree---------- White oak---------- Sweetgum----------	65 90 57 ---	43 86 43 ---	Virginia pine, black oak, scarlet oak, tuliptree, white oak, white pine, bur oak, black gum.
EemAQ:										
Elk----------	7A	Slight	Slight	Slight	Slight	Severe	Tuliptree---------- Pin oak---------- Red maple----------	94 96 ---	100 72 ---	Cherrybark oak, eastern white pine, tuliptree, white ash, white oak, green ash, swamp chestnut oak, bur oak.
EesA, EesAQ:										
Elkinsville----	5A	Slight	Slight	Slight	Slight	Severe	White oak---------- Tuliptree----------	90 118	72 143	Shumard's oak, black cherry, green ash, black walnut, cherrybark oak, eastern white pine, tuliptree, white ash, white oak.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
EesA, EesAQ:										
Millstone------	7A	Slight	Slight	Slight	Slight	Severe	Tuliptree----------	98	100	Shumard's oak,
							White oak----------	90	72	green ash,
							Northern red oak----	80	57	black walnut,
										cherrybark
										oak, eastern
										white pine,
										northern red
										oak,
										tuliptree,
										white ash,
										white oak.
EesD2, EesDQ:										
Elkinsville----	5R	Moderate	Moderate	Slight	Slight	Severe	White oak----------	90	72	Shumard's oak,
							Tuliptree----------	118	143	black cherry,
										green ash,
										black walnut,
										cherrybark
										oak, eastern
										white pine,
										tuliptree,
										white ash,
										white oak.
Millstone------	7R	Moderate	Moderate	Slight	Slight	Severe	Tuliptree----------	98	100	Shumard's oak,
							White oak----------	90	72	green ash,
							Northern red oak----	80	57	black walnut,
										cherrybark
										oak, eastern
										white pine,
										northern red
										oak,
										tuliptree,
										white ash,
										white oak.
EesFQ:										
Elkinsville----	5R	Moderate	Moderate	Slight	Slight	Severe	White oak----------	90	72	Green ash,
							Tuliptree----------	118	143	black cherry,
										black walnut,
										cherrybark
										oak, eastern
										white pine,
										tuliptree,
										white ash,
										white oak.
Millstone------	7R	Moderate	Moderate	Slight	Slight	Severe	Tuliptree----------	98	100	Green ash,
							White oak----------	90	72	black walnut,
							Northern red oak----	80	57	cherrybark,
										oak, eastern
										white pine,
										northern red
										oak,
										tuliptree,
										white ash,
										white oak.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
GacAW:										
Gatchel	7A	Slight	Slight	Slight	Slight	Moderate	Tuliptree	95	100	Swamp white oak,
							American sycamore	---	---	swamp chestnut
							Northern red oak	---	---	oak,
							Black oak	---	---	green ash,
										northern red
										oak, tuliptree,
										white pine,
										white ash.
GhaA:										
Ginat	5W	Slight	Severe	Moderate	Severe	Severe	Pin oak	90	72	Baldcypress,
							Sweetgum	90	100	blackgum, bur
							White oak	75	57	oak, green
										ash, pecan,
										red maple,
										pin oak,
										overcup oak,
										swamp white
										oak, sweetgum.
HbhA:										
Hartz	7A	Slight	Moderate	Slight	Slight	Severe	Tuliptree	95	100	Shumard's oak,
										eastern white
										pine, green
										ash, northern
										red oak,
										sweetgum,
										tuliptree,
										white ash,
										cherrybark oak,
										white oak.
HcaA, HcbAQ:										
Hatfield	4A	Slight	Moderate	Slight	Moderate	Severe	White oak	75	57	Cherrybark oak,
							Tuliptree	85	86	baldcypress,
							Sweetgum	88	100	bur oak,
							Pin oak	88	72	green ash,
										pecan,
										red maple,
										swamp white
										oak,
										tuliptree,
										white ash.
HcgAH:										
Haymond	8A	Slight	Moderate	Severe	Slight	Severe	Tuliptree	100	114	Cherrybark oak,
										bur oak,
										Shumard's oak,
										swamp chestnut,
										oak, green,
										ash,
										tuliptree,
										white ash.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
HcgAQ:										
Haymond	8A	Slight	Slight	Slight	Slight	Severe	Tuliptree	100	114	Cherrybark oak, bur oak, Shumard's oak, swamp chestnut, oak, black walnut, eastern white pine, green ash, tuliptree, white ash.
							White oak	90	72	
							Black walnut	70	---	
HsaB2:										
Hosmer	4A	Slight	Slight	Slight	Moderate	Severe	White oak	68	57	Bur oak, black oak, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
							Tuliptree	93	100	
							Pin oak	87	72	
							Virginia pine	75	114	
HubAH:										
Huntington	7A	Slight	Moderate	Severe	Slight	Severe	Tuliptree	95	100	Bur oak, blackgum, Shumard's oak, cherrybark oak, northern red oak, pecan, swamp chestnut oak, tuliptree.
							Northern red oak	85	57	
JoaA:										
Johnsburg	4D	Slight	Moderate	Slight	Moderate	Severe	Northern red oak	75	57	Cherrybark oak, bur oak, Shingle oak, baldcypress, swamp chestnut oak, pin oak, red maple, swamp white oak.
							Tuliptree	94	100	
							Pin oak	85	72	
							Sweetgum	80	86	
							White oak	70	57	
JoeG:										
Jubin	3X	Moderate	Severe	Moderate	Slight	Moderate	Northern red oak	60	43	Bur oak, black oak, eastern white pine, green ash, northern red oak, tuliptree, white oak, Virginia pine.
							White oak	---	---	
							Sugar maple	---	---	

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
JoeG:										
Branchville----	3R	Severe	Severe	Slight	Slight	Moderate	Northern red oak----	60	43	Bur oak, black oak, eastern white pine, green ash, northern red oak, tuliptree, white oak, Virginia pine.
Rock outcrop.										
LeaA:										
Lauer----------	7W	Slight	Moderate	Slight	Moderate	Severe	Tuliptree----------	96	100	Bur oak, green ash, cherrybark oak, northern red oak, red maple,tuliptree, swamp chestnut oak, pecan, white ash, white oak.
							Northern red oak----	---	---	
							Black oak----------	---	---	
McgC2:										
Markland-------	8C	Slight	Slight	Slight	Slight	Severe	Tuliptree----------	105	114	Shumard's oak, northern red oak, green ash, swamp chestnut oak, tuliptree, white ash, white oak.
McnGQ:										
Markland-------	8R	Severe	Severe	Slight	Slight	Severe	Tuliptree----------	105	114	Shumard's oak, northern red oak, green ash, swamp chestnut oak, tuliptree, white ash.
McpC3:										
Markland-------	7C	Slight	Slight	Slight	Slight	Severe	Tuliptree----------	95	100	Shumard's oak, green ash, northern red oak, bur oak, swamp chestnut oak, tuliptree, white ash, white oak.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
McuDQ:										
Markland-------	7R	Moderate	Moderate	Slight	Slight	Severe	Tuliptree----------	95	100	Shumard's oak, green ash, northern red oak, white oak, swamp chestnut oak, tuliptree, white ash.
MhkAH:										
McAdoo---------	8W	Slight	Moderate	Severe	Slight	Severe	Sweetgum----------	92	114	Bur oak, cherrybark oak, Shumard's oak, swamp chestnut oak, green ash, tuliptree, white ash.
MhuA:										
McGary---------	4W	Slight	Moderate	Slight	Moderate	Severe	White oak----------	70	57	Cherrybark oak, shingle oak, baldcypress, bur oak, swamp chestnut oak, green ash, red maple, swamp white oak, sweetgum, tuliptree, white ash.
							Tuliptree----------	85	86	
							Pin oak----------	85	72	
							Sweetgum----------	80	86	
MsbB, MsbBQ, MsbC2, MsbCQ:										
Millstone------	7A	Slight	Slight	Slight	Slight	Severe	Tuliptree----------	98	100	Shumard's oak, green ash, black walnut, cherrybark oak, eastern white pine, northern red oak, swamp chestnut oak, tuliptree, white ash, white oak.
							White oak----------	90	72	
							Northern red oak----	80	57	
Elkinsville----	5A	Slight	Slight	Slight	Slight	Severe	White oak----------	90	72	Shumard's oak, black cherry, black walnut, cherrybark oak, eastern white pine,swamp chestnut oak, tuliptree, white ash, white oak, green ash.
							Tuliptree----------	118	143	

See footnote and end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
NbgAH:										
Newark---------	5W	Slight	Moderate	Severe	Moderate	Severe	Pin oak----------	96	72	Cherrybark oak,
							Eastern cottonwood--	89	100	shingle oak,
							Sweetgum----------	85	86	Shumard's oak,
							Green ash----------	---	---	green ash, pin
							Overcup oak---------	---	---	oak, swamp
							Cherrybark oak------	---	---	white oak,
							Shumard's oak-------	---	---	swamp chestnut
										oak, sweetgum.
PhwA, PhwB2:										
Percell--------	7A	Slight	Slight	Slight	Slight	Severe	Tuliptree----------	95	100	Black cherry,
										cherrybark oak,
										black walnut,
										eastern white
										pine, green
										ash, northern
										red oak,
										tuliptree,
										white ash,
										white oak.
PkaAH:										
Petrolia-------	5W	Slight	Severe	Severe	Severe	Severe	Pin oak----------	90	72	Baldcypress,
							Eastern cottonwood--	100	129	blackgum, bur
							Cherrybark oak------	---	---	oak, pin oak,
							American sycamore---	---	---	red maple, swamp
							Sweetgum----------	---	---	white oak,
										sweetgum,
										overcup oak.
PsmA:										
Princeton------	5A	Slight	Slight	Slight	Slight	Moderate	White oak----------	90	72	Shumard's oak,
							Tuliptree----------	98	100	black cherry,
							Sweetgum----------	76	72	black walnut,
										cherrybark
										oak, eastern
										white pine,
										northern red
										oak,
										tuliptree,
										white ash,
										white oak.
RatAH:										
Rahm----------	8A	Slight	Moderate	Severe	Moderate	Severe	Tuliptree----------	100	114	Cherrybark oak,
										swamp chestnut
										oak, Shumard's
										oak, green ash,
										red maple,
										swamp white
										oak,
										tuliptree,
										white ash.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
RgvB, RgvC2:										
Rickert	8A	Slight	Slight	Slight	Slight	Severe	Tuliptree	105	114	Black cherry, black walnut, eastern white pine, northern red oak, tuliptree, white ash, white oak, cherrybark oak, green ash.
							Northern red oak	---	---	
Alford	8A	Slight	Slight	Slight	Slight	Severe	Tuliptree	105	114	Black cherry, black walnut, eastern white pine, northern red oak, tuliptree, white ash, white oak, cherrybark oak, green ash.
							Northern red oak	---	---	
RgvC3, RgvD3:										
Rickert	8R	Moderate	Moderate	Slight	Slight	Severe	Tuliptree	105	114	Bur oak, black oak, eastern white pine, northern red oak, green ash, tuliptree, white ash, white oak.
							Northern red oak	---	---	
Alford	8R	Moderate	Moderate	Slight	Slight	Severe	Tuliptree	105	114	Bur oak, black oak, eastern white pine, northern red oak, green ash, tuliptree, white ash, white oak.
							Northern red oak	---	---	
RtcB2, RtcC2:										
Ryker	7A	Slight	Slight	Slight	Slight	Severe	White oak	90	72	Black cherry, black walnut, cherrybark oak, eastern white pine, green ash, northern red oak, white ash, white oak.
							Tuliptree	98	100	
							Sweetgum	76	72	

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
ScbA, ScbAQ, ScdB, ScdBQ:										
Sciotoville	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak	80	57	Cherrybark oak, bur oak, swamp chestnut oak, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
							Eastern white pine	90	172	
							Tuliptree	90	86	
							Sugar maple	80	57	
							White ash	---	---	
							Black cherry	---	---	
							White oak	---	---	
SfyB2:										
Shircliff	8C	Slight	Slight	Slight	Slight	Severe	Tuliptree	105	114	Cherrybark oak, eastern white pine, green ash, northern red oak, swamp chestnut oak, tuliptree, white ash, white oak.
StdAH:										
Stendal	5W	Slight	Moderate	Severe	Slight	Severe	Pin oak	90	72	Pin oak, swamp white oak, cherrybark oak, green ash, pecan, swamp chestnut oak, sweetgum, tuliptree.
							Tuliptree	90	86	
							Virginia pine	90	129	
							Cottonwood	88	100	
							Sweetgum	85	86	
TakC:										
Tapawingo	2D	Slight	Slight	Severe	Severe	Moderate	Northern red oak	45	29	Virginia pine, black oak, eastern white pine, green ash, northern red oak, tuliptree.
TakD:										
Tapawingo	2D	Moderate	Moderate	Severe	Severe	Moderate	Northern red oak	45	29	Virginia pine, black oak, eastern white pine, green ash, northern red oak, tuliptree, black locust, eastern redcedar.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
TckA, TckB:										
Tobinsport	8A	Slight	Slight	Slight	Slight	Severe	Tuliptree	101	114	Black cherry, black walnut, cherrybark oak, eastern white pine, green ash, northern red oak, tuliptree, white ash, white oak.
							Northern red oak	---	---	
							Black oak	---	---	
Uaa.										
Udorthents										
UabBK:										
Udipsamments	3W	Slight	Slight	Severe	Slight	Moderate	Black oak	65	43	Virginia pine, black oak, eastern white pine, green ash, bur oak, blackgum, eastern redcedar.
Uas:										
Udorthents.										
Pits, quarries.										
UddD:										
Urban land.										
Alford	8A	Slight	Slight	Slight	Slight	Severe	Tuliptree	105	114	Black cherry, black walnut, eastern white pine, northern red oak, tuliptree, white ash, white oak, cherrybark oak, green ash.
							Northern red oak	---	---	
UehB:										
Urban land.										
Elkinsville	5A	Slight	Slight	Slight	Slight	Severe	White oak	90	72	Shumard's oak, black cherry, green ash, black walnut, cherrybark oak, eastern white pine, tuliptree, white ash, white oak.
							Tuliptree	118	143	

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
UehB:										
Hatfield	4A	Slight	Moderate	Slight	Severe	Severe	White oak	75	57	American sycamore, baldcypress, bur oak, eastern white pine, green ash, pecan, red maple, swamp white oak, tuliptree, white ash.
							Pin oak	88	72	
							Sweetgum	88	100	
							Tuliptree	85	86	
UffY.										
Urban land										
W.										
Water										
WaaAH:										
Wakeland	5A	Slight	Moderate	Severe	Moderate	Severe	Pin oak	90	72	Shumard's oak, green ash, shingle oak, baldcypress, pin oak, overcup oak, red maple, swamp white oak, bur oak.
							Virginia pine	85	129	
							Tuliptree	90	86	
							Sweetgum	88	100	
WokAH:										
Wilbur	8A	Slight	Moderate	Severe	Slight	Severe	Tuliptree	100	114	Swamp chestnut oak, overcup oak, Shumard's oak, white ash, swamp white oak, green ash, tuliptree.
WprAH:										
Wirt	8A	Slight	Moderate	Severe	Slight	Severe	Tuliptree	105	114	Swamp chestnut oak, Shumard's oak, swamp white oak, overcup oak, green ash, tuliptree, white ash.
WrlAH:										
Woodmere	8A	Slight	Moderate	Severe	Slight	Severe	Tuliptree	100	114	Shumard's oak, swamp chestnut oak, swamp white oak, overcup oak, green ash, tuliptree, white ash.

See footnote at end of table.

Table 10.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Suggested trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber*	
ZcaA: Zipp	5W	Slight	Severe	Severe	Severe	Severe	Pin oak Sweetgum White ash White oak	85 90 90 75	72 100 129 57	Overcup oak, baldcypress, bur oak, green ash, pecan, pin oak, swamp white oak, sweetgum, blackgum, red maple.

* Volume of wood fiber 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 11.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AbvD2, AbvD3:					
Adyeville	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly, slope.	Severe: erodes easily.	Moderate: slope, depth to rock, droughty.
Wellston	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Deuchars	Moderate: percs slowly, slope, wetness.	Moderate: percs slowly, slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
AccG:					
Adyeville	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: erodes easily, slope.	Severe: slope.
Tipsaw	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope, small stones.	Severe: erodes easily, slope.	Severe: slope.
Ebal	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: erodes easily, slope.	Severe: slope.
AcuF:					
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
AfzG:					
Alvin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tobinsport	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
AgrA, AgrB:					
Apalona	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Slight.
AgrC2:					
Apalona	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly, slope.	Severe: erodes easily.	Moderate: slope.
AgrC3:					
Apalona	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly, slope.	Severe: erodes easily.	Moderate: slope, wetness.

Table 11.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BkeC2:					
Bloomfield	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: slope, droughty.
Alvin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
BodAH, BodAM:					
Bonnie	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.
CndAH:					
Combs	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
CwaAH:					
Cuba	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
DduC2:					
Deuchars	Moderate: percs slowly, slope, wetness.	Moderate: percs slowly, slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
EabD2, EabD3:					
Ebal	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: erodes easily.	Severe: slope.
Deuchars	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Kitterman	Severe: percs slowly, slope, wetness.	Severe: percs slowly, slope.	Severe: percs slowly, slope, wetness.	Moderate: slope, wetness.	Severe: slope.
EemAQ:					
Elk	Severe: flooding.	Slight	Slight	Slight	Slight.
EesA:					
Elkinsville	Slight	Slight	Slight	Slight	Slight.
Millstone	Slight	Slight	Slight	Slight	Slight.
EesAQ:					
Elkinsville	Severe: flooding.	Slight	Slight	Slight	Slight.
Millstone	Severe: flooding.	Slight	Slight	Slight	Slight.
EesD2:					
Elkinsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Millstone	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

Table 11.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EesDQ:					
Elkinsville	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Millstone	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
EesFQ:					
Elkinsville	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
Millstone	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
GacAW:					
Gatchel	Severe: flooding.	Slight	Moderate: flooding, small stones.	Slight	Moderate: flooding, droughty.
GhaA:					
Ginat	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
HbhA:					
Hartz	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
HcaA:					
Hatfield	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.
HcbAQ:					
Hatfield	Severe: flooding, percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.
HcgAH:					
Haymond	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
HcgAQ:					
Haymond	Severe: flooding.	Slight	Slight	Slight	Slight.
HsaB2:					
Hosmer	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Moderate: wetness.	Moderate: wetness.
HubAH:					
Huntington	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
JoaA:					
Johnsburg	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.

Table 11.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
JoeG:					
Jubin	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope, small stones.
Branchville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
LeaA:					
Lauer	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
McgC2, McpC3:					
Markland	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
McnGQ:					
Markland	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
McuDQ:					
Markland	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
MhkAH:					
McAdoo	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
MhuA:					
McGary	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MsbB:					
Millstone	Slight	Slight	Moderate: slope.	Slight	Slight.
Elkinsville	Slight	Slight	Moderate: slope.	Slight	Slight.
MsbBQ:					
Millstone	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
Elkinsville	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
MsbC2:					
Millstone	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Elkinsville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MsbCQ:					
Millstone	Severe: flooding.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Elkinsville	Severe: flooding.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

Table 11.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
NbgAH:					
Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.
PhwA:					
Percell	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Slight	Slight.
PhwB2:					
Percell	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Slight	Slight.
PkaAH:					
Petrolia	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.
PsmA:					
Princeton	Slight	Slight	Slight	Slight	Slight.
RatAH:					
Rahm	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.
RgvB:					
Rickert	Slight	Slight	Moderate: slope.	Slight	Slight.
Alford	Slight	Slight	Moderate: slope.	Slight	Slight.
RgvC2, RgvC3:					
Rickert	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Alford	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
RgvD3:					
Rickert	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
RtcB2:					
Ryker	Slight	Slight	Moderate: slope.	Slight	Slight.
RtcC2:					
Ryker	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
ScbA, ScdB:					
Sciotoville	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

Table 11.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ScbAQ, ScdBQ:					
Sciotoville	Severe: flooding, wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
SfyB2:					
Shircliff	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Severe: erodes easily.	Moderate: wetness.
StdAH:					
Stendal	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.
TakC:					
Tapawingo	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly, slope.	Slight	Moderate: droughty.
TakD:					
Tapawingo	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: erodes easily.	Severe: slope.
TckA:					
Tobinsport	Slight	Slight	Slight	Slight	Slight.
TckB:					
Tobinsport	Slight	Slight	Moderate: slope.	Slight	Slight.
Uaa.					
Udorthents					
UabBK:					
Udipsamments	Severe: flooding.	Slight	Moderate: flooding, slope.	Slight	Moderate: flooding, droughty.
Uas:					
Udorthents.					
Pits, quarries.					
UddD:					
Urban land.					
Alford	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
UehB:					
Urban land.					
Elkinsville	Slight	Slight	Moderate: slope.	Slight	Slight.
Hatfield	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.

Table 11.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
UffY.					
Urban land					
W.					
Water					
WaaAH:					
Wakeland	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.
WokAH:					
Wilbur	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.
WprAH:					
Wirt	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
WrlAH:					
Woodmere	Severe: flooding.	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
ZcaA:					
Zipp	Severe: too clayey, ponding.	Severe: too clayey, ponding.	Severe: too clayey, ponding.	Severe: too clayey, ponding.	Severe: too clayey, ponding.

Table 12.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Forestland wildlife	Wetland wildlife
AbvD2, AbvD3:										
Adyeville	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Wellston	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Deuchars	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AccG:										
Adyeville	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Tipsaw	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Ebal	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AcuF:										
Alford	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
AfzG:										
Alvin	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Tobinsport	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
AgrA:										
Apalona	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
AgrB2:										
Apalona	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
AgrC2, AgrC3:										
Apalona	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BkeC2:										
Bloomfield	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Alvin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BodAH:										
Bonnie	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
BodAM:										
Bonnie	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
CndAH:										
Combs	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Forestland wildlife	Wetland wildlife
CwaAH:										
Cuba	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
DduC2:										
Deuchars	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EabD2, EabD3:										
Ebal	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Deuchars	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Kitterman	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Poor.
EemAQ:										
Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EesA, EesAQ:										
Elkinsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Millstone	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EesD2, EesDQ:										
Elkinsville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Millstone	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EesFQ:										
Elkinsville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Millstone	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
GacAW:										
Gatchel	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
GhaA:										
Ginat	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
HbhA:										
Hartz	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
HcaA, HcbAQ:										
Hatfield	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
HcgAH:										
Haymond	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
HcgAQ:										
Haymond	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Very poor.

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Forestland wildlife	Wetland wildlife
HsaB2:										
Hosmer	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
HubAH:										
Huntington	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
JoaA:										
Johnsburg	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
JoeG:										
Jubin	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Very poor.	Fair	Very poor.
Branchville	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
LeaA:										
Lauer	Fair	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
McgC2, McpC3:										
Markland	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
McnGQ:										
Markland	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
McuDQ:										
Markland	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MhkAH:										
McAdoo	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Fair	Very poor.
MhuA:										
McGary	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
MsbB, MsbBQ:										
Millstone	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Elkinsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MsbC2, MsbCQ:										
Millstone	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Elkinsville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NbgAH:										
Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
PhwA, PhwB2:										
Percell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Forestland wildlife	Wetland wildlife
PkaAH:										
Petrolia	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
PsmA:										
Princeton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RatAH:										
Rahm	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
RgvB:										
Rickert	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Alford	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RgvC2, RgvC3:										
Rickert	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Alford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RgvD3:										
Rickert	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Alford	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RtcB2:										
Ryker	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RtcC2:										
Ryker	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ScbA, ScbAQ:										
Sciotoville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
ScdB, ScdBQ:										
Sciotoville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SfyB2:										
Shircliff	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
StdAH:										
Stendal	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
TakC, TakD:										
Tapawingo	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
TckA, TckB:										
Tobinsport	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Uaa.										
Udorthents										

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Forestland wildlife	Wetland wildlife
UabBK:										
Udipsamments	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Uas:										
Udorthents.										
Pits, quarries.										
UddD:										
Urban land.										
Alford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UehB:										
Urban land.										
Elkinsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Hatfield	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
UffY.										
Urban land										
W.										
Water										
WaaAH:										
Wakeland	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
WokAH:										
Wilbur	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
WprAH:										
Wirt	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
WrlAH:										
Woodmere	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
ZcaA:										
Zipp	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

Table 13.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of terms used in this table. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AbvD2, AbvD3:						
Adyeville	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: frost action, slope.	Moderate: slope, depth to rock, droughty.
Wellston	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
Deuchars	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: shrink-swell, wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
AccG:						
Adyeville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tipsaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ebal	Severe: slope, wetness.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope, wetness.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell, slope.	Severe: slope.
AcuF:						
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
AfzG:						
Alvin	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tobinsport	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
AgrA:						
Apalona	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
AgrB:						
Apalona	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Slight.
AgrC2:						
Apalona	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AgrC3:						
Apalona	Severe: wetness.	Moderate: slope, wetness.	Severe: shrink-swell, wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope, wetness.
BkeC2:						
Bloomfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
Alvin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: frost action, slope.	Moderate: slope.
BodAH, BodAM:						
Bonnie	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding.
CndAH:						
Combs	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
CwaAH:						
Cuba	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action, low strength.	Severe: flooding.
DduC2:						
Deuchars	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: shrink-swell, wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
EabD2, EabD3:						
Ebal	Severe: slope, wetness.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope, wetness.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell, slope.	Severe: slope.
Deuchars	Severe: slope, wetness.	Severe: slope.	Severe: shrink-swell, slope, wetness.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
Kitterman	Severe: slope, wetness.	Severe: shrink-swell, slope, wetness.	Severe: shrink-swell, slope, wetness.	Severe: shrink-swell, slope, wetness.	Severe: low strength, shrink-swell, slope.	Severe: slope.
EemAQ:						
Elk	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
EesA:						
Elkinsville	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action.	Slight.
Millstone	Slight	Slight	Slight	Slight	Moderate: frost action.	Slight.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EesAQ:						
Elkinsville	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
Millstone	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Slight.
EesD2:						
Elkinsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.	Severe: slope.
Millstone	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
EesDQ, EesFQ:						
Elkinsville	Severe: slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: frost action, slope.	Severe: slope.
Millstone	Severe: slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: slope.	Severe: slope.
GacAW:						
Gatchel	Moderate: flooding, large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, droughty.
GhaA:						
Ginat	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
HbhA:						
Hartz	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
HcaA:						
Hatfield	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
HcbAQ:						
Hatfield	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
HcgAH:						
Haymond	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
HcgAQ:						
Haymond	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HsaB2:						
Hosmer	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Moderate: wetness.
HubAH:						
Huntington	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
JoaA:						
Johnsburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
JoeG:						
Jubin	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, slope, small stones.
Branchville	Severe: slope, wetness.	Severe: slope.	Severe: shrink-swell, slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
LeaA:						
Lauer	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
McgC2, McpC3:						
Markland	Moderate: slope, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
McnGQ, McuDQ:						
Markland	Severe: slope.	Severe: flooding, shrink-swell, slope.	Severe: flooding, shrink-swell, slope.	Severe: flooding, shrink-swell, slope.	Severe: low strength, shrink-swell, slope.	Severe: slope.
MhkAH:						
McAdoo	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action, low strength.	Severe: flooding.
MhuA:						
McGary	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MsbB:						
Millstone	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
Elkinsville	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action.	Slight.
MsbBQ:						
Millstone	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Slight.
Elkinsville	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
MsbC2:						
Millstone	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: frost action, slope.	Moderate: slope.
Elkinsville	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
MsbCQ:						
Millstone	Moderate: slope.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: flooding, frost action, slope.	Moderate: slope.
Elkinsville	Moderate: slope.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: frost action.	Moderate: slope.
NbgAH:						
Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: flooding, wetness.
PhwA:						
Percell	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
PhwB2:						
Percell	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Slight.
PkaAH:						
Petrolia	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding.
PsmA:						
Princeton	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RatAH:						
Rahm	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: flooding, wetness.
RgvB:						
Rickert	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
Alford	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
RgvC2, RgvC3:						
Rickert	Moderate: slope, wetness.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope, wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
Alford	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
RgvD3:						
Rickert	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
RtcB2:						
Ryker	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
RtcC2:						
Ryker	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
ScbA, ScdB:						
Sciotoville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
ScbAQ, ScdBQ:						
Sciotoville	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: frost action.	Moderate: wetness.
SfyB2:						
Shircliff	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell, wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
StdAH:						
Stendal	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: flooding, wetness.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TakC:						
Tapawingo	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Moderate: droughty.
TakD:						
Tapawingo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
TckA, TckB:						
Tobinsport	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
Uaa.						
Udorthents						
UabBK:						
Udipsamments	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, droughty.
Uas:						
Udorthents.						
Pits, quarries.						
UddD:						
Urban land.						
Alford	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
UehB:						
Urban land.						
Elkinsville	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action.	Slight.
Hatfield	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
UffY.						
Urban land						
W.						
Water						
WaaAH:						
Wakeland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action, wetness.	Severe: flooding, wetness.
WokAH:						
Wilbur	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WprAH:						
Wirt	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
WrlAH:						
Woodmere	Moderate: flooding, too clayey, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action, low strength.	Severe: flooding.
ZcaA:						
Zipp	Severe: ponding.	Severe: shrink-swell, ponding.	Severe: shrink-swell, ponding.	Severe: shrink-swell, ponding.	Severe: low strength, shrink-swell, ponding.	Severe: too clayey, ponding.

Table 14.--Sanitary Facilities

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AbvD2, AbvD3:					
Adyeville	Severe: percs slowly, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: small stones, depth to rock.
Wellston	Moderate: slope, depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Fair: area reclaim, slope, thin layer.
Deuchars	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, wetness.	Poor: hard to pack, too clayey.
AccG:					
Adyeville	Severe: percs slowly, slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope, small stones, depth to rock.
Tipsaw	Severe: percs slowly, slope, depth to rock.	Severe: seepage, slope, depth to rock.	Severe: slope, depth to rock.	Severe: seepage, slope, depth to rock.	Poor: slope, small stones, depth to rock.
Ebal	Severe: percs slowly, slope, wetness.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: hard to pack, slope, too clayey.
AcuF:					
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
AfzG:					
Alvin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, slope.
Tobinsport	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
AgrA:					
Apalona	Severe: percs slowly, wetness.	Moderate: seepage.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
AgrB:					
Apalona	Severe: percs slowly, wetness.	Moderate: seepage, slope.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
AgrC2:					
Apalona	Severe: percs slowly, wetness.	Severe: slope.	Moderate: slope, too clayey, wetness.	Moderate: slope, wetness.	Fair: slope, too clayey, wetness.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AgrC3:					
Apalona	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Moderate: slope, wetness.	Poor: hard to pack, too clayey.
BkeC2:					
Bloomfield	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Alvin	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
BodAH, BodAM:					
Bonnie	Severe: flooding, percs slowly, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
CndAH:					
Combs	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
CwaAH:					
Cuba	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Severe: flooding.	Good.
DduC2:					
Deuchars	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, wetness.	Poor: hard to pack, too clayey.
EabD2, EabD3:					
Ebal	Severe: percs slowly, slope, wetness.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: hard to pack, slope, too clayey.
Deuchars	Severe: percs slowly, slope, wetness.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: hard to pack, slope, too clayey.
Kitterman	Severe: percs slowly, wetness, depth to rock.	Severe: slope, depth to rock.	Severe: slope, wetness, depth to rock.	Severe: slope, wetness, depth to rock.	Poor: hard to pack, too clayey, depth to rock.
EemAQ:					
Elk	Severe: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: flooding, wetness.	Good.
EesA:					
Elkinsville	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: too clayey.
Millstone	Slight	Moderate: seepage.	Slight	Slight	Good.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EesAQ:					
Elkinsville	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Fair: too clayey.
Millstone	Moderate: flooding.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Slight.
EesD2, EesDQ, EesFQ:					
Elkinsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Millstone	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
GacAW:					
Gatchel	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, large stones, seepage.	Severe: flooding, seepage.	Poor: seepage, small stones.
GhaA:					
Ginat	Severe: percs slowly, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: thin layer, ponding.
HbhA:					
Hartz	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
HcaA, HcbAQ:					
Hatfield	Severe: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
HcgAH:					
Haymond	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
HcgAQ:					
Haymond	Moderate: flooding.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Good.
HsaB2:					
Hosmer	Severe: percs slowly, wetness.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
HubAH:					
Huntington	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
JoaA:					
Johnsburg	Severe: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
JoeG:					
Jubin	Severe: large stones, slope.	Severe: large stones, seepage, slope.	Severe: large stones, seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope.
Branchville	Severe: percs slowly, slope, wetness.	Severe: large stones, slope.	Severe: slope, too clayey.	Severe: slope.	Poor: hard to pack, slope, too clayey.
Rock outcrop.					
LeaA:					
Lauer	Severe: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
McgC2, McpC3:					
Markland	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: hard to pack, too clayey.
McnGQ, McuDQ:					
Markland	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: hard to pack, slope, too clayey.
MhkAH:					
McAdoo	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
MhuA:					
McGary	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
MsbB:					
Millstone	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
Elkinsville	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
MsbBQ:					
Millstone	Moderate: flooding.	Moderate: seepage, slope.	Moderate: flooding.	Slight	Good.
Elkinsville	Moderate: flooding, percs slowly.	Moderate: seepage, slope.	Moderate: flooding.	Slight	Fair: too clayey.
MsbC2:					
Millstone	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Elkinsville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope, too clayey.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MsbCQ:					
Millstone	Moderate: flooding, slope.	Severe: slope.	Moderate: flooding, slope.	Moderate: slope.	Fair: slope.
Elkinsville	Moderate: flooding, percs slowly, slope.	Severe: slope.	Moderate: flooding, slope.	Moderate: slope.	Fair: slope, too clayey.
NbgAH:					
Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
PhwA, PhwB2:					
Percell	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: thin layer, too clayey, wetness.
PkaAH:					
Petrolia	Severe: flooding, percs slowly, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
PsmA:					
Princeton	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
RatAH:					
Rahm	Severe: flooding, percs slowly, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
RgvB:					
Rickert	Severe: percs slowly, wetness.	Moderate: seepage, slope, wetness.	Moderate: too clayey, wetness.	Slight	Fair: too clayey.
Alford	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
RgvC2, RgvC3:					
Rickert	Severe: percs slowly, wetness.	Severe: slope.	Moderate: slope, too clayey, wetness.	Moderate: slope.	Fair: slope, too clayey.
Alford	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RgvD3:					
Rickert	Severe: percs slowly, slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
RtcB2:					
Ryker	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
RtcC2:					
Ryker	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
ScbA, ScbAQ, ScdB, ScdBQ:					
Sciotoville	Severe: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
SfyB2:					
Shircliff	Severe: percs slowly, wetness.	Moderate: seepage, slope.	Severe: too clayey, wetness.	Moderate: wetness.	Poor: hard to pack, too clayey.
StdAH:					
Stendal	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
TakC:					
Tapawingo	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: small stones, too clayey.
TakD:					
Tapawingo	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
TckA, TckB:					
Tobinsport	Slight	Severe: seepage.	Severe: seepage.	Slight	Good.
Uaa.					
Udorthents					
UabBK:					
Udipsamments	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
Uas:					
Udorthents.					
Pits, quarries.					

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
UddD:					
Urban land.					
Alford	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
UehB:					
Urban land.					
Elkinsville	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
Hatfield	Severe: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
UffY.					
Urban land					
W.					
Water					
WaaAH:					
Wakeland	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
WokAH:					
Wilbur	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
WprAH:					
Wirt	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
WrlAH:					
Woodmere	Severe: flooding, percs slowly, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
ZcaA:					
Zipp	Severe: percs slowly, ponding.	Severe: ponding.	Severe: too clayey, ponding.	Severe: ponding.	Poor: hard to pack, too clayey, ponding.

Table 15.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AbvD2, AbvD3:				
Adyeville	Poor: thin layer, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Wellston	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Deuchars	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer, too clayey.
AccG:				
Adyeville	Poor: slope, thin layer, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Tipsaw	Poor: slope, thin layer, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Ebal	Poor: low strength, shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.
AcuF:				
Alford	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AfzG:				
Alvin	Poor: slope.	Probable	Improbable: too sandy.	Poor: slope, too sandy.
Tobinsport	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AgrA, AgrB:				
Apalona	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
AgrC2:				
Apalona	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
AgrC3:				
Apalona	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer, too clayey.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
BkeC2:				
Bloomfield	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Alvin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
BodAH, BodAM:				
Bonnie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CndAH:				
Combs	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
CwaAH:				
Cuba	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
DduC2:				
Deuchars	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer, too clayey.
EabD2, EabD3:				
Ebal	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.
Deuchars	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Kitterman	Poor: low strength, shrink-swell, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.
EemAQ:				
Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
EesA, EesAQ:				
Elkinsville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Millstone	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
EesD2, EesDQ:				
Elkinsville	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
Millstone	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, too clayey.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
EesFQ:				
Elkinsville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Millstone	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
GacAW:				
Gatchel	Fair: large stones.	Improbable: large stones, small stones.	Improbable: large stones.	Poor: area reclaim, small stones, thin layer.
GhaA:				
Ginat	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HbhA:				
Hartz	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
HcaA, HcbAQ:				
Hatfield	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HcgAH, HcgAQ:				
Haymond	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
HsaB2:				
Hosmer	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
HubAH:				
Huntington	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
JoaA:				
Johnsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
JoeG:				
Jubin	Poor: large stones, slope.	Improbable: large stones, excess fines.	Improbable: large stones, excess fines.	Poor: large stones, slope, small stones.
Branchville	Poor: low strength, shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Rock outcrop.				
LeaA:				
Lauer	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
McgC2, McpC3:				
Markland	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
McnGQ:				
Markland	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
McuDQ:				
Markland	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
MhkAH:				
McAdoo	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
MhuA:				
McGary	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
MsbB, MsbBQ:				
Millstone	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
Elkinsville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
MsbC2, MsbCQ:				
Millstone	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, too clayey.
Elkinsville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
NbgAH:				
Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
PhwA, PhwB2:				
Percell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
PkaAH:				
Petrolia	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
PsmA:				
Princeton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
RatAH:				
Rahm	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
RgvB:				
Rickert	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Alford	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
RgvC2, RgvC3:				
Rickert	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Alford	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
RgvD3:				
Rickert	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Alford	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
RtcB2:				
Ryker	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
RtcC2:				
Ryker	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
ScbA, ScbAQ, ScdB, ScdBQ:				
Sciotoville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
SfyB2:				
Shircliff	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
StdAH:				
Stendal	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
TakC:				
Tapawingo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
TakD:				
Tapawingo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
TckA, TckB:				
Tobinsport	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Uaa.				
Udorthents				

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
UabBK:				
Udipsamments	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Uas:				
Udorthents.				
Pits, quarries.				
UddD:				
Urban land.				
Alford	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
UehB:				
Urban land.				
Elkinsville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Hatfield	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
UffY.				
Urban land				
W.				
Water				
WaaAH:				
Wakeland	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
WokAH:				
Wilbur	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
WprAH:				
Wirt	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
WrlAH:				
Woodmere	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
ZcaA:				
Zipp	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

Table 16.--Water Management

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AbvD2, AbvD3:							
Adyeville	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: erodes easily, slope, depth to rock.	Limitation: erodes easily, slope, depth to rock.
Wellston	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
Deuchars	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, slope, wetness.	Limitation: erodes easily, percs slowly, slope.
AccG:							
Adyeville	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope, soil blowing, depth to rock.	Limitation: slope, soil blowing, depth to rock.	Limitation: slope, depth to rock.
Tipsaw	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Limitation: deep to water.	Limitation: percs slowly, slope, depth to rock.	Limitation: large stones, slope, depth to rock.	Limitation: large stones, slope, depth to rock.
Ebal	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: percs slowly, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope, wetness.	Limitation: erodes easily, percs slowly, slope.
AcuF:							
Alford	Severe: slope.	Moderate: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
AfzG:							
Alvin	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Limitation: deep to water.	Limitation: fast intake, slope.	Limitation: slope.	Limitation: slope.
Tobinsport	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
AgrA:							
Apalona	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: frost action, percs slowly.	Limitation: erodes easily, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, rooting depth.
AgrB:							
Apalona	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, rooting depth.
AgrC2:							
Apalona	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, slope, wetness.	Limitation: erodes easily, rooting depth, slope.
AgrC3:							
Apalona	Severe: slope.	Moderate: hard to pack, thin layer, wetness.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, slope, wetness.	Limitation: erodes easily, rooting depth, slope.
BkeC2:							
Bloomfield	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Limitation: deep to water.	Limitation: fast intake, slope, soil blowing.	Limitation: slope, too sandy, soil blowing.	Limitation: slope.
Alvin	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
BodAH, BodAM:							
Bonnie	Slight	Severe: ponding.	Moderate: slow refill.	Limitation: flooding, frost action, ponding.	Limitation: erodes easily, flooding, ponding.	Limitation: erodes easily, wetness.	Limitation: erodes easily, wetness.
CndAH:							
Combs	Severe: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: flooding.	Favorable	Favorable.
CwaAH:							
Cuba	Severe: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, flooding.	Limitation: erodes easily.	Limitation: erodes easily.
DduC2:							
Deuchars	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, slope, wetness.	Limitation: erodes easily, percs slowly, slope.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
EabD2, EabD3:							
Ebal	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: percs slowly, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope, wetness.	Limitation: erodes easily, percs slowly, slope.
Deuchars	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, slope, wetness.	Limitation: erodes easily, percs slowly, slope.
Kitterman	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: percs slowly, slope, depth to rock.	Limitation: slope, depth to rock, droughty.	Limitation: slope, wetness, depth to rock.	Limitation: slope, wetness, droughty.
EemAQ:							
Elk	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Limitation: deep to water.	Limitation: erodes easily.	Limitation: erodes easily.	Limitation: erodes easily.
EesA, EesAQ:							
Elkinsville	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily.	Limitation: erodes easily.	Limitation: erodes easily.
Millstone	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily.	Limitation: erodes easily.	Limitation: erodes easily.
EesD2, EesDQ, EesFQ:							
Elkinsville	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
Millstone	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
GacAW:							
Gatchel	Severe: seepage.	Severe: large stones, seepage.	Severe: no water.	Limitation: deep to water.	Limitation: flooding, large stones, droughty.	Limitation: large stones.	Limitation: large stones, droughty.
GhaA:							
Ginat	Moderate: seepage.	Severe: piping, ponding.	Severe: slow refill.	Limitation: frost action, percs slowly, ponding.	Limitation: erodes easily, percs slowly, ponding.	Limitation: erodes easily, percs slowly, ponding.	Limitation: erodes easily, wetness.
HbhA:							
Hartz	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: frost action.	Limitation: erodes easily, wetness.	Limitation: erodes easily, wetness.	Limitation: erodes easily, wetness.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
HcaA, HcbAQ:							
Hatfield	Slight	Severe: wetness.	Severe: no water.	Limitation: frost action, percs slowly.	Limitation: erodes easily, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, rooting depth, wetness.
HcgAH, HcgAQ:							
Haymond	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, flooding.	Limitation: erodes easily.	Limitation: erodes easily.
HsaB2:							
Hosmer	Moderate: seepage, slope.	Moderate: piping, wetness.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, rooting depth.
HubAH:							
Huntington	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: flooding.	Favorable	Favorable.
JoaA:							
Johnsburg	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Limitation: frost action, percs slowly.	Limitation: erodes easily, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, wetness.
JoeG:							
Jubin	Severe: seepage, slope.	Severe: large stones, seepage.	Severe: no water.	Limitation: deep to water.	Limitation: large stones, slope, droughty.	Limitation: large stones, slope.	Limitation: large stones, slope, droughty.
Branchville	Severe: slope.	Severe: hard to pack, large stones.	Severe: no water.	Limitation: percs slowly, slope.	Limitation: large stones, percs slowly, slope.	Limitation: large stones, slope, wetness.	Limitation: large stones, slope, droughty.
Rock outcrop.							
LeaA:							
Lauer	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Limitation: frost action.	Limitation: erodes easily, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, wetness.
McgC2, McnGQ, McpC3, McuDQ:							
Markland	Severe: slope.	Moderate: hard to pack, thin layer.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
MhkAH:							
McAdoo	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, flooding.	Limitation: erodes easily.	Limitation: erodes easily.
MhuA:							
McGary	Slight	Severe: wetness.	Severe: no water.	Limitation: frost action, percs slowly.	Limitation: erodes easily, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, wetness.
MsbB, MsbBQ:							
Millstone	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily.	Limitation: erodes easily.
Elkinsville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily.	Limitation: erodes easily.
MsbC2, MsbCQ:							
Millstone	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
Elkinsville	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
NbgAH:							
Newark	Moderate: seepage.	Severe: piping. wetness.	Moderate: slow refill.	Limitation: flooding, frost action.	Limitation: erodes easily, flooding.	Limitation: erodes easily, wetness.	Limitation: erodes easily, wetness.
PhwA:							
Percell	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: frost action.	Limitation: erodes easily, wetness.	Limitation: erodes easily, wetness.	Limitation: erodes easily.
PhwB2:							
Percell	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: frost action, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, wetness.	Limitation: erodes easily.
PkaAH:							
Petrolia	Slight	Severe: ponding.	Severe: slow refill.	Limitation: flooding, frost action, ponding.	Limitation: erodes easily flooding, ponding.	Limitation: erodes easily, ponding.	Limitation: erodes easily, wetness.
PsmA:							
Princeton	Severe: seepage.	Moderate: piping, thin layer.	Severe: no water.	Limitation: deep to water.	Favorable	Favorable	Favorable.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
RatAH:							
Rahm	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Limitation: flooding, frost action, percs slowly.	Limitation: erodes easily, flooding, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, wetness.
RgvB:							
Rickert	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily.	Limitation: erodes easily.
Alford	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily.	Limitation: erodes easily.
RgvC2, RgvC3, RgvD3:							
Rickert	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
Alford	Severe: slope.	Moderate: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
RtcB2:							
Ryker	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily.	Limitation: erodes easily.
RtcC2:							
Ryker	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
ScbA, ScbAQ:							
Sciotoville	Moderate: seepage.	Severe: piping.	Severe: no water.	Limitation: frost action, percs slowly.	Limitation: erodes easily, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, rooting depth.
ScdB, ScdBQ:							
Sciotoville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly, rooting depth.
SfyB2:							
Shircliff	Moderate: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Limitation: frost action, percs slowly, slope.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, percs slowly.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
StdAH:							
Stendal	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Limitation: flooding, frost action.	Limitation: erodes easily, flooding.	Limitation: erodes easily, wetness.	Limitation: erodes easily, wetness.
TakC:							
Tapawingo	Moderate: slope.	Moderate: piping.	Severe: no water.	Limitation: deep to water.	Limitation: percs slowly, slope, droughty.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, rooting depth, droughty.
TakD:							
Tapawingo	Severe: slope.	Moderate: piping.	Severe: no water.	Limitation: deep to water.	Limitation: percs slowly, slope, droughty.	Limitation: erodes easily, percs slowly, slope.	Limitation: erodes easily, rooting depth, droughty.
TckA:							
Tobinsport	Severe: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily.	Limitation: erodes easily.	Limitation: erodes easily.
TckB:							
Tobinsport	Severe: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily.	Limitation: erodes easily.
Uaa.							
Udorthents							
UabBK:							
Udipsamments	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Limitation: deep to water.	Limitation: flooding, slope, droughty.	Limitation: too sandy, soil blowing.	Limitation: droughty.
Uas:							
Udorthents.							
Pits, quarries.							
UddD:							
Urban land.							
Alford	Severe: slope.	Moderate: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.	Limitation: erodes easily, slope.
UehB:							
Urban land.							
Elkinsville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, slope.	Limitation: erodes easily.	Limitation: erodes easily.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
UehB:							
Hatfield	Slight	Severe: wetness.	Severe: no water.	Limitation: frost action, percs slowly.	Limitation: erodes easily, percs slowly.	Limitation: erodes easily, percs slowly, wetness.	Limitation: erodes easily, rooting depth, wetness.
UffY.							
Urban land							
W.							
Water							
WaaAH:							
Wakeland	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Limitation: flooding, frost action.	Limitation: erodes easily, flooding.	Limitation: erodes easily, wetness.	Limitation: erodes easily, wetness.
WokAH:							
Wilbur	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Limitation: flooding, frost action.	Limitation: erodes easily, flooding.	Limitation: erodes easily, wetness.	Limitation: erodes easily.
WprAH:							
Wirt	Severe: seepage.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: erodes easily, flooding.	Limitation: erodes easily.	Limitation: erodes easily.
WrlAH:							
Woodmere	Moderate: seepage.	Moderate: piping, wetness.	Severe: slow refill.	Limitation: flooding, frost action.	Limitation: erodes easily, flooding.	Limitation: erodes easily, wetness.	Limitation: erodes easily.
ZcaA:							
Zipp	Slight	Severe: ponding.	Severe: slow refill.	Limitation: percs slowly, ponding.	Limitation: percs slowly, slow intake, ponding.	Limitation: percs slowly, ponding.	Limitation: percs slowly, wetness.

Table 17.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AbvD2:												
Adyeville	0-9	Silt loam	CL-ML, ML	A-4	0	0-2	90-100	90-100	85-100	65-90	12-25	1-7
	9-24	Loam, channery fine sandy loam, silt loam.	CL-ML, GM, SM, ML	A-2-4, A-1-b, A-4	0-2	0-10	60-100	50-95	35-90	20-70	12-25	1-7
	24-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Wellston	0-8	Silt loam	ML, CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-100	22-40	3-17
	8-26	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-7-6, A-6	0	0	100	100	90-100	75-100	23-48	3-27
	26-41	Silt loam, loam, sandy loam.	CL-ML, CL, SC, SC-SM	A-4, A-6, A-2	0	0-5	80-98	75-95	45-90	25-70	20-35	5-15
	41-54	Very channery loam, channery sandy loam, channery clay loam.	GC-GM, CL, SC, SC-SM	A-1-b, A-6, A-2, A-4	0-25	0-30	60-90	50-85	30-80	15-65	20-35	5-15
	54-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Deuchars	0-10	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	75-100	22-40	1-17
	10-30	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7-6	0	0	100	100	90-100	75-100	24-50	4-30
	30-55	Silty clay, clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0-1	90-100	90-100	85-100	80-95	37-68	15-45
	55-62	Silty clay, clay.	CH, CL	A-7-6	0	0-1	90-100	90-100	85-100	80-95	41-68	20-45
	62-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
AbvD3:												
Adyeville	0-3	Silt loam	CL-ML, ML	A-4	0	0-2	90-100	90-100	85-100	65-90	12-25	1-7
	3-24	Loam, channery fine sandy loam, silt loam.	ML, CL-ML, GM, SM	A-2-4, A-4	0-2	2-10	60-100	50-95	35-90	20-70	12-25	1-7
	24-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Wellston	0-3	Silt loam	ML, CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	3-22	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6, A-7-6	0	0	100	100	90-100	75-100	23-48	3-27
	22-33	Silt loam, loam, sandy loam.	CL-ML, SC, CL, SC-SM	A-4, A-6, A-2	0	0-5	80-98	75-95	45-90	25-70	20-35	5-15
	33-50	Very channery loam, channery sandy loam, channery clay loam.	GC-GM, CL, SC, SC-SM	A-2, A-1-b, A-4, A-6	0-5	0-30	60-90	50-85	30-80	15-65	20-35	5-15
	50-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AbvD3:												
Deuchars	0-3	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	75-100	22-40	1-17
	3-24	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0	100	100	90-100	75-100	24-50	4-30
	24-55	Silty clay, clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0-1	90-100	90-100	85-100	80-95	37-68	15-45
	55-62	Silty clay, clay.	CH, CL	A-7-6	0	0-1	90-100	90-100	85-100	80-95	41-68	20-45
	62-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
AccG:												
Adyeville	0-9	Very fine sandy loam.	ML, SC-SM, CL-ML, SM	A-4	0	0-2	90-100	90-100	75-95	45-65	12-22	1-6
	9-24	Loam, channery fine sandy loam, silt loam.	GM, CL-ML, ML, SM	A-1-b, A-2-4, A-4	0-2	0-10	60-100	50-95	35-90	20-70	12-25	1-7
	24-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Tipsaw	0-5	Very fine sandy loam.	ML, SC-SM, CL-ML, SM	A-4	0-2	0-5	90-100	85-100	70-95	45-65	10-24	NP-7
	5-28	Loam, very fine sandy loam, channery sandy loam.	ML, SC-SM, CL-ML, SM	A-2-4, A-4	0-15	0-25	55-95	50-85	30-75	15-65	10-24	NP-7
	28-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Ebal	0-5	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0-2	80-100	80-100	75-100	60-95	23-40	1-17
	5-9	Channery silt loam, very channery loam, silty clay loam.	CL, SC, GC	A-2, A-7-6, A-6	0-2	0-15	50-100	45-95	35-95	30-90	30-48	12-25
	9-20	Channery silty clay, very channery clay, silty clay.	CL, CH, GC	A-7-6	0-2	3-15	50-100	45-95	40-95	35-90	40-55	20-30
	20-67	Clay, silty clay.	CH, CL	A-7-6	0-2	0-3	95-100	90-100	85-100	80-95	48-70	25-45
	67-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
AcuF:												
Alford	0-5	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	23-40	3-15
	5-61	Silty clay loam, silt loam.	CL	A-6, A-4, A-7-6	0	0	100	100	95-100	90-100	25-50	8-32
	61-80	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-100	15-40	3-20

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AfzG:												
Alvin	0-5	Loam	CL-ML, ML	A-4	0	0	100	100	85-100	60-75	12-20	1-5
	5-12	Fine sandy loam, sandy loam, loamy sand.	ML, SM	A-2-4, A-4	0	0	100	100	70-100	15-60	0-25	NP-4
	12-38	Sandy loam, loam, fine sandy loam.	CL, ML, SM, SC	A-2, A-6, A-4	0	0	100	100	70-100	20-80	15-40	NP-15
	38-80	Fine sandy loam, loamy fine sand, sand.	SM, SP-SM	A-2, A-3, A-4	0	0	100	100	50-85	5-45	0-20	NP-4
Tobinsport	0-9	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-95	22-40	NP-17
	9-27	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-7-6, A-6	0	0	100	100	95-100	85-95	23-45	2-24
	27-52	Loam, fine sandy loam, very fine sandy loam.	ML, CL, SC, SM	A-4	0	0	100	100	70-95	40-75	15-28	3-9
	52-80	Loamy fine sand, very fine sandy loam, fine sandy loam.	ML, SC-SM, CL-ML, SM	A-2-4, A-4	0	0	100	100	75-95	20-65	0-22	NP-7
AgrA:												
Apalona	0-9	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	9-30	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	85-100	23-50	2-29
	30-54	Silt loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4, A-7-6	0	0	95-100	90-100	75-100	55-100	22-45	5-20
	54-75	Clay, silty clay, clay loam.	CH, CL	A-7-6	0	0-20	70-100	65-100	60-100	50-95	43-66	21-39
	75-90	Loam, sandy clay loam, very channery sandy loam.	CL, SC	A-2, A-4, A-1-b, A-6	0	0-30	55-100	50-100	35-95	20-75	20-40	5-21
	90-99	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
AgrB, AgrC2:												
Apalona	0-8	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	8-25	Silt loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4, A-7-6	0	0	100	100	95-100	85-100	23-50	2-29
	25-49	Silt loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4, A-7-6	0	0	95-100	90-100	75-100	55-100	22-45	5-20
	49-69	Clay, silty clay, channery clay loam.	CH, CL	A-7-6	0	0-20	70-100	65-100	60-100	50-95	43-66	21-39
	69-90	Loam, sandy clay loam, very channery sandy loam.	CL, SC	A-2, A-4, A-1-b, A-6	0	0-30	55-100	50-100	35-95	20-75	20-40	5-21
	90-99	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AgrC3:												
Apalona	0-4	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	3-17
	4-20	Silt loam, silty clay loam.	CL-ML, CL, ML	A-6, A-4, A-7-6	0	0	100	100	95-100	85-100	23-50	2-29
	20-39	Silt loam, silty clay loam, loam.	CL-ML, CL	A-6, A-4, A-7-6	0	0	95-100	90-100	75-100	55-100	22-45	5-20
	39-71	Silty clay, clay, channery clay loam.	CH, CL	A-7-6	0	0-20	70-100	65-100	60-100	50-95	43-66	21-39
	71-90	Loam, sandy clay loam, very channery sandy loam.	CL, SC	A-2, A-4, A-1-b, A-6	0	0-30	55-100	50-100	35-95	20-70	20-40	5-21
	90-99	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
BkeC2:												
Bloomfield	0-4	Loamy sand	SM, SM, SP-SM	A-2-4	0	0	100	100	70-90	15-30	0-14	NP
	4-17	Loamy fine sand, sand, loamy sand.		A-2-4, A-3	0	0	100	100	70-100	5-35	0-14	NP
	17-80	Fine sand, loamy fine sand, sand.	SM, SP-SM	A-2-4, A-3	0	0	100	100	70-100	5-35	0-20	NP-3
Alvin	0-11	Loam	CL-ML, ML	A-4	0	0	100	100	85-100	60-75	12-20	1-5
	11-15	Sandy loam, fine sandy loam, loamy sand.	ML, SM	A-2-4, A-4	0	0	100	100	70-90	15-60	0-25	NP-4
	15-60	Fine sandy loam, sandy loam, loam.	CL, SM, ML, SC	A-4, A-2, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	60-80	Fine sandy loam, loamy fine sand, sand.	SM, SP-SM	A-3, A-2, A-4	0	0	100	100	50-85	5-45	0-20	NP-4
BodAH:												
Bonnie	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-38	5-12
	10-40	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-38	5-12
	40-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-100	25-40	5-15
BodAM:												
Bonnie	0-4	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	75-95	25-38	5-12
	4-22	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	75-90	25-38	5-12
	22-60	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	75-90	25-38	5-12
CndAH:												
Combs	0-16	Loam	CL, CL-ML, ML	A-4	0	0	100	100	80-95	50-75	15-25	2-9
	16-49	Loam, fine sandy loam, sandy loam.	ML, SC, CL, SM	A-2-4, A-4	0	0	100	100	60-95	30-75	15-28	2-10
	49-80	Loam, fine sandy loam, silt loam.	ML, SC, CL, SM	A-2, A-4, A-6	0	0	100	100	60-100	30-90	15-35	2-18

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
CwaAH:												
Cuba	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-98	20-38	4-15
	8-30	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-98	22-38	5-15
	30-60	Silt loam, loam, loamy sand.	ML, CL, SC, SM	A-2, A-2-4, A-6, A-4	0	0	90-100	80-100	50-100	25-98	15-38	2-15
DduC2:												
Deuchars	0-10	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	75-100	22-40	1-17
	10-30	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	90-100	75-100	24-50	4-30
	30-55	Silty clay, clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0-1	90-100	90-100	85-100	80-95	37-68	15-45
	55-62	Silty clay, clay.	CH, CL	A-7-6	0	0-1	90-100	90-100	85-100	80-95	41-68	20-45
	62-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
EabD2:												
Ebal	0-7	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0-2	80-100	80-100	75-100	60-95	23-40	1-17
	7-13	Channery silt loam, very channery loam, silty clay loam.	CL, GC, SC	A-6, A-2, A-7-6	0-2	0-15	50-100	45-95	35-95	30-90	30-48	12-25
	13-21	Channery silty clay, very channery clay, silty clay.	CL, CH, GC	A-7-6	0-2	3-15	50-100	45-95	40-95	35-90	40-55	20-30
	21-80	Clay, silty clay.	CH, CL	A-7-6	0-2	0-3	95-100	90-100	85-100	80-95	48-70	25-45
	80-90	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Deuchars	0-10	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	75-100	22-40	1-17
	10-30	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7-6	0	0	100	100	90-100	75-100	24-50	4-30
	30-55	Silty clay, clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0-1	90-100	90-100	85-100	80-95	37-68	15-45
	55-62	Silty clay, clay.	CH, CL	A-7-6	0	0-1	90-100	90-100	85-100	80-95	41-68	20-45
	62-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Kitterman	0-4	Channery silty clay loam.	CH, CL, ML	A-6, A-7-6	0-3	0-20	80-100	80-100	75-100	70-95	38-58	11-30
	4-26	Clay, channery clay.	CH	A-7-6	0-3	0-20	80-100	80-100	75-100	70-95	51-68	27-43
	26-35	Clay, channery clay, silty clay.	CH, CL	A-7-6	0-3	0-20	80-100	80-100	75-100	70-95	41-70	17-45
	35-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EabD3:												
Ebal	0-3	Silty clay loam	CL	A-6, A-7-6	0	0-2	80-100	80-100	75-100	70-95	33-48	12-27
	3-9	Channery silt loam, very channery loam, silty clay loam.	CL, SC, GC	A-6, A-2, A-7-6	0-2	0-15	50-100	45-95	35-95	30-90	30-48	12-25
	9-17	Channery silty clay, very channery clay, silty clay.	CH, GC, CL	A-7-6	0-2	3-15	50-100	45-95	40-95	35-90	40-55	20-30
	17-67	Clay, silty clay.	CH, CL	A-7-6	0-2	0-3	95-100	90-100	85-100	80-95	48-70	25-45
	67-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Deuchars	0-5	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	75-100	22-40	1-17
	5-24	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	0	100	100	90-100	75-100	24-50	4-30
	24-55	Silty clay, clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0-1	90-100	90-100	85-100	80-95	37-68	15-45
	55-62	Silty clay, clay.	CH, CL	A-7-6	0	0-1	90-100	90-100	85-100	80-95	41-68	20-45
	62-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Kitterman	0-2	Channery silty clay loam.	CL, CH, ML	A-6, A-7-6	0-3	0-20	80-100	80-100	75-100	70-95	38-58	11-30
	2-22	Clay, channery clay.	CH	A-7-6	0-3	0-20	80-100	80-100	75-100	70-95	51-68	27-43
	22-27	Clay, channery clay, silty clay.	CH, CL	A-7-6	0-3	0-20	80-100	80-100	75-100	70-95	41-70	17-45
	27-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
EemAQ:												
Elk	0-8	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	2-15
	8-49	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	75-100	22-40	2-15
	49-62	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-100	65-100	22-40	2-15
	62-80	Loam, silt loam, sandy loam.	SC, CL, ML, SM	A-4, A-2, A-6	0	0	85-100	75-100	45-100	25-90	16-36	2-15
EesA, EesAQ:												
Elkinsville	0-8	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	75-95	22-40	2-15
	8-38	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7, A-6	0	0	100	100	90-100	75-95	25-50	5-28
	38-65	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	90-100	70-100	35-80	24-38	7-14
	65-80	Loam, sandy loam, clay loam.	CL-ML, CL, SC, SC-SM	A-2-6, A-2-4, A-4, A-6	0	0	95-100	90-100	55-100	25-80	22-35	5-12

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EesA, EesAQ:												
Millstone-------	0-12	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-95	55-75	21-40	NP-17
	12-65	Silt loam, very fine sandy loam, clay loam.	CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	80-100	60-95	35-75	20-40	5-18
	65-80	Loam, very fine sandy loam, gravelly loam.	ML, SC, CL, SM	A-2-4, A-6, A-4	0	0	80-100	50-100	30-95	15-75	15-30	2-11
EesD2, EesDQ:												
Elkinsville-----	0-6	Silt loam------	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	75-95	22-40	2-15
	6-28	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7	0	0	100	100	90-100	75-95	25-50	5-28
	28-54	Loam, clay loam, sandy clay loam.	CL-ML, SC, CL, SC-SM	A-4, A-6	0	0	95-100	90-100	70-100	35-80	24-38	7-14
	54-80	Loam, sandy loam, clay loam.	CL-ML, SC, CL, SC-SM	A-2-4, A-6, A-2-6, A-4	0	0	95-100	90-100	55-100	25-80	22-35	5-12
Millstone-------	0-7	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-95	55-75	21-40	NP-17
	7-56	Very fine sandy loam, silt loam, clay loam.	CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	80-100	60-95	35-75	20-40	5-18
	56-80	Loam, very fine sandy loam, gravelly loam.	ML, CL, SC, SM	A-2-4, A-6, A-4	0	0	80-100	50-100	30-95	15-75	15-30	2-11
EesFQ:												
Elkinsville-----	0-5	Silt loam------	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	75-95	22-40	2-15
	5-24	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7	0	0	100	100	90-100	75-95	25-50	5-28
	24-50	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	90-100	70-100	35-80	24-38	7-14
	50-80	Loam, sandy loam, clay loam.	CL, SC-SM, CL-ML, SC	A-2-6, A-4, A-2-4, A-6	0	0	95-100	90-100	55-100	25-80	22-35	5-12
Millstone-------	0-6	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-95	55-75	21-40	NP-17
	6-54	Very fine sandy loam, silt loam, clay loam.	CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	80-100	60-95	35-75	20-40	5-18
	54-80	Loam, very fine sandy loam, gravelly loam.	ML, CL, SC, SM	A-4, A-2-4, A-6	0	0	80-100	50-100	30-95	15-75	15-30	2-11
GacAW:												
Gatchel---------	0-4	Loam----------	CL, CL-ML, ML	A-4	0-1	0-5	90-100	85-100	70-95	50-75	16-27	2-9
	4-18	Sandy loam, fine sandy loam, loam.	SC-SM, SM, ML, CL-ML	A-2-4, A-4	0-1	0-5	90-100	85-100	50-95	30-75	14-23	2-7
	18-60	Very channery loam, extremely channery coarse sandy loam.	GC-GM, GM	A-2-4, A-1	0-10	25-65	25-55	20-50	10-45	5-35	14-23	2-7

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GhaA:												
Ginat	0-9	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	9-32	Silt loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4, A-7-6	0	0	100	100	90-100	85-95	23-48	3-26
	32-46	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0	98-100	95-100	90-100	85-95	24-50	4-29
	46-80	Silty clay loam, silty clay, loam.	CH, CL-ML, CL	A-4, A-6, A-7-6	0	0	98-100	95-100	80-100	60-95	25-60	5-35
HbhA:												
Hartz	0-9	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	85-95	22-40	1-17
	9-65	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	0	100	100	90-100	85-95	24-50	4-29
	65-75	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	85-100	41-62	16-35
	75-80	Silt loam, silty clay loam, silty clay.	CH, CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-54	10-32
HcaA:												
Hatfield	0-7	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	85-100	75-95	22-39	2-15
	7-20	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	90-100	90-100	85-100	75-95	24-40	3-18
	20-36	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0	90-100	90-100	85-100	75-95	26-50	5-26
	36-78	Silt loam, silty clay loam, loam.	CL	A-4, A-6, A-7-6	0	0	90-100	90-100	75-100	55-95	24-44	8-24
	78-83	Silt loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4, A-7-6	0	0	90-100	90-100	75-100	55-95	20-44	5-24
HcbAQ:												
Hatfield	0-10	Silty clay loam	CL	A-6, A-7-6	0	0	90-100	90-100	85-100	75-95	35-50	11-24
	10-32	Silty clay loam	CL	A-6, A-7-6	0	0	90-100	90-100	85-100	75-95	35-50	11-26
	32-64	Silty clay loam, silt loam.	CL	A-4, A-6, A-7-6	0	0	90-100	90-100	85-100	75-95	24-44	8-24
	64-80	Silty clay loam, loam.	CL-ML, CL	A-6, A-4, A-7-6	0	0	90-100	90-100	75-100	55-95	20-44	5-24
HcgAH, HcgAQ:												
Haymond	0-10	Silt loam	CL-ML, CL, ML	A-4	0	0	100	100	90-100	85-100	20-30	3-10
	10-44	Silt loam	CL, CL-ML, ML	A-4	0	0	100	100	90-100	80-100	20-30	3-10
	44-60	Fine sandy loam, silt loam, loam.	ML, SC, CL, SM	A-4, A-6	0	0	95-100	90-100	65-100	35-90	15-35	2-15
HsaB2:												
Hosmer	0-8	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	22-40	NP-17
	8-30	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	23-48	4-27
	30-63	Silt loam, silty clay loam.	CL	A-4, A-6	0	0	100	100	90-100	75-100	24-40	8-24
	63-80	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	70-95	23-40	2-17

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
HubAH:												
Huntington------	0-12	Silty clay loam	CL	A-7-6, A-6	0	0	100	100	90-100	80-100	35-50	11-24
	12-70	Silt loam, silty clay loam.	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	75-100	26-50	8-28
	70-80	Stratified sandy loam to silty clay loam, silt loam.	CL-ML, SC, CL, SC-SM	A-4, A-7-6, A-6	0	0	100	100	65-100	35-95	20-48	5-22
JoaA:												
Johnsburg-------	0-10	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	80-100	22-40	1-17
	10-36	Silty clay loam, silt loam.	CL-ML, CL, ML	A-6, A-4, A-7	0	0	100	100	90-100	80-100	23-50	2-28
	36-72	Silt loam, silty clay loam.	CL	A-4, A-6	0	0-5	95-100	90-100	60-95	36-95	24-40	8-24
	72-90	Silt loam, channery clay loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0-2	0-10	55-100	50-100	45-95	35-90	20-40	4-24
	90-99	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
JoeG:												
Jubin----------	0-4	Very stony loam	ML, CL, SC, SM	A-2-4, A-4	30-50	15-55	50-80	45-75	40-70	30-55	16-29	3-10
	4-24	Extremely channery fine sandy loam, extremely bouldery loam, very channery loam.	GM, GC, SC, SM	A-1-b, A-4, A-2-4	30-80	15-50	35-75	30-70	20-65	15-50	16-29	3-10
	24-80	Extremely channery fine sandy loam, extremely bouldery loam, channery loam.	GM, GC, SC, SM	A-2-4, A-1-b, A-4	20-60	15-80	35-75	30-70	20-65	15-50	16-29	3-10
Branchville-----	0-3	Channery loam--	ML, CL, SC, SM	A-4	0-10	5-25	60-90	55-85	50-80	35-65	16-25	3-8
	3-23	Channery loam, very channery loam, extremely flaggy sandy loam.	GP-GM, ML, CL, SM	A-1-b, A-2-4, A-4	10-60	15-70	25-90	20-85	10-80	5-65	16-29	3-10
	23-29	Channery clay loam, very channery clay loam, very flaggy sandy clay loam.	CL, SC	A-2, A-7, A-6	0-40	5-50	40-90	35-85	30-85	15-70	30-50	11-25
	29-55	Clay, silty clay.	CH, CL	A-7-6	0-2	0-5	90-100	85-100	75-100	65-95	41-70	20-45
	55-80	Clay, silty clay.	CH, CL	A-7-6	0-1	0-2	90-100	90-100	80-100	70-95	41-68	20-45
Rock outcrop.												

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
LeaA:												
Lauer	0-8	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	8-54	Silt loam, silty clay loam.	CL-ML, CL, ML	A-6, A-4, A-7-6	0	0	100	100	95-100	85-100	23-50	2-29
	54-63	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	80-100	41-62	16-35
	63-80	Silt loam, silty clay loam, silty clay.	CH, ML, CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	80-100	23-54	2-32
McgC2:												
Markland	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20
	6-25	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	25-42	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	42-80	Silty clay, silty clay loam, silt loam.	CL, CH, CL-ML	A-6, A-4, A-7-6	0	0	100	100	95-100	90-100	15-55	4-30
McnGQ:												
Markland	0-4	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20
	4-28	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	28-59	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	59-80	Silty clay, silty clay loam, silt loam.	CH, CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	15-55	4-30
McpC3:												
Markland	0-4	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	35-50	15-30
	4-20	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	20-42	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	42-80	Silty clay, silty clay loam, silt loam.	CH, CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	15-55	4-30

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
McuDQ:												
Markland--------	0-4	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	35-50	15-30
	4-18	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	18-40	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-62	20-36
	40-80	Silty clay, silty clay loam, silt loam.	CH, CL, CL-ML	A-4, A-7-6, A-6	0	0	100	100	95-100	90-100	15-55	4-30
MhkAH:												
McAdoo----------	0-10	Silty clay loam	CL, ML	A-6, A-7-6	0	0	100	100	95-100	85-95	37-50	11-24
	10-48	Silt loam, silty clay loam.	CL, ML	A-4, A-7-6, A-6	0	0	100	100	90-100	70-95	26-50	2-24
	48-60	Silt loam, loam, silty clay loam.	CL-ML, CL, ML	A-6, A-4, A-7-6	0	0	100	100	85-100	60-95	22-50	2-25
MhuA:												
McGary----------	0-11	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20
	11-42	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-60	20-34
	42-50	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-60	20-34
	50-60	Silty clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0	100	100	95-100	90-100	38-60	15-34
MsbB, MsbBQ:												
Millstone-------	0-10	Loam-----------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-95	55-75	21-40	NP-17
	10-62	Very fine sandy loam, silt loam, clay loam.	CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	80-100	60-95	35-75	20-40	5-18
	62-80	Loam, very fine sandy loam, gravelly loam.	ML, CL, SC, SM	A-4, A-2-4, A-6	0	0	80-100	50-100	30-95	15-75	15-30	2-11
Elkinsville-----	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	75-95	22-40	2-15
	8-34	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7, A-6	0	0	100	100	90-100	75-95	25-50	5-28
	34-60	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	90-100	70-100	35-80	24-38	7-14
	60-80	Loam, sandy loam, clay loam.	CL, SC-SM, CL-ML, SC	A-2-6, A-2-4, A-4, A-6	0	0	95-100	90-100	55-100	25-80	22-35	5-12

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MsbC2, MsbCQ:												
Millstone-------	0-8	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-95	55-75	21-40	NP-17
	8-58	Very fine sandy loam, silt loam, clay loam.	CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	80-100	60-95	35-75	20-40	5-18
	58-80	Loam, very fine sandy loam, gravelly loam.	ML, CL, SC, SM	A-2-4, A-6, A-4	0	0	80-100	50-100	30-95	15-75	15-30	2-11
Elkinsville-----	0-7	Silt loam------	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	75-95	22-40	2-15
	7-30	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7	0	0	100	100	90-100	75-95	25-50	5-28
	30-56	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	90-100	70-100	35-80	24-38	7-14
	56-80	Loam, sandy loam, clay loam.	CL, SC-SM, CL-ML, SC	A-2-6, A-4, A-2-4, A-6	0	0	95-100	90-100	55-100	25-80	22-35	5-12
NbgAH:												
Newark----------	0-11	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	90-100	80-100	35-50	11-25
	11-51	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-7-6, A-6	0	0	100	100	90-100	80-100	22-50	3-25
	51-60	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-7-6, A-6	0	0	100	100	90-100	75-100	22-50	3-25
PhwA:												
Percell---------	0-9	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	9-56	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-7-6, A-6	0	0	100	100	95-100	85-100	23-50	2-29
	56-79	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	80-100	41-62	16-35
	79-90	Silty clay, silty clay loam, silt loam.	CH, CL, ML, CL-ML	A-6, A-4, A-7-6	0	0	100	100	95-100	80-100	23-54	2-32
PhwB2:												
Percell---------	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	8-49	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-7-6, A-6	0	0	100	100	95-100	85-100	23-50	2-29
	49-70	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	80-100	41-62	16-35
	70-80	Silty clay, silty clay loam, silt loam.	CH, ML, CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	80-100	23-54	2-32
PkaAH:												
Petrolia--------	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-24
	8-30	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-45	15-25
	30-80	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-7, A-4	0	0	100	100	85-100	75-100	20-45	5-20

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
PsmA:												
Princeton	0-8	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-95	60-75	20-30	5-15
	8-41	Sandy clay loam, fine sandy loam, loam.	CL, SC	A-4, A-6	0	0	100	100	70-90	35-70	25-35	8-18
	41-60	Sand, loamy fine sand, loam.	CL-ML, CL, SC, SC-SM	A-4, A-2, A-6	0	0	100	100	60-90	30-70	15-25	5-15
	60-80	Stratified fine sand to loam.	CL-ML, SM, ML, SC-SM	A-2-4, A-4	0	0	100	100	65-90	20-65	0-20	NP-5
RatAH:												
Rahm	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	75-100	30-50	11-24
	8-24	Silty clay loam, silt loam.	CL	A-6, A-4, A-7	0	0	100	100	90-100	85-95	25-50	8-24
	24-51	Silty clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-60	15-35
	51-80	Silty clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-60	15-35
RgvB:												
Rickert	0-9	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	9-54	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	25-50	4-28
	54-80	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	NP-16
Alford	0-9	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	23-40	3-15
	9-72	Silty clay loam, silt loam.	CL	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	25-50	8-32
	72-80	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-100	15-40	3-20
RgvC2:												
Rickert	0-8	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	8-49	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	25-50	4-28
	49-80	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	NP-16
Alford	0-6	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	23-40	3-15
	6-72	Silty clay loam, silt loam.	CL	A-4, A-7-6, A-6	0	0	100	100	95-100	90-100	25-50	8-32
	72-80	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-100	15-40	3-20
RgvC3:												
Rickert	0-6	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	6-42	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0	100	100	95-100	90-100	25-50	4-28
	42-80	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	NP-16
Alford	0-4	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	23-40	3-15
	4-72	Silty clay loam, silt loam.	CL	A-6, A-4, A-7-6	0	0	100	100	95-100	90-100	25-50	8-32
	72-80	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	70-100	15-40	3-20

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
RgvD3:												
Rickert	0-5	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	1-17
	5-42	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	25-50	4-28
	42-80	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	NP-16
Alford	0-4	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	23-40	3-15
	4-72	Silty clay loam, silt loam.	CL	A-4, A-7-6, A-6	0	0	100	100	95-100	90-100	25-50	8-32
	72-80	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	90-100	70-100	15-40	3-20
RtcB2:												
Ryker	0-6	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	3-17
	6-30	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4, A-7-6	0	0	100	100	95-100	85-100	23-48	3-28
	30-80	Silty clay loam, clay loam.	CL	A-6, A-7	0	0-2	85-100	80-100	70-100	55-95	24-50	11-27
RtcC2:												
Ryker	0-6	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	3-17
	6-25	Silt loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4, A-7-6	0	0	100	100	95-100	85-100	23-48	3-28
	25-80	Silty clay loam, clay loam.	CL	A-6, A-7	0	0-2	85-100	80-100	70-100	55-95	24-50	11-27
ScbA, ScbAQ, ScdB, ScdBQ:												
Sciotoville	0-9	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	95-100	95-100	85-100	65-95	22-40	3-15
	9-27	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0	95-100	90-100	80-100	70-90	20-44	4-24
	27-50	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0-2	95-100	90-100	75-100	55-90	25-44	4-24
	50-80	Loam, silty clay loam, sandy loam.	ML, CL, SC, SM	A-6, A-4, A-7-6, A-2-4	0	0-2	80-100	80-100	55-100	30-85	5-44	NP-24
SfyB2:												
Shircliff	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20
	8-19	Silty clay loam, silt loam.	CL	A-6, A-4, A-7-6	0	0	100	100	95-100	90-100	26-50	8-30
	19-43	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-65	20-40
	43-80	Silty clay, silty clay loam, silt loam.	CH, CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	90-100	16-55	5-30

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
StdAH:												
Stendal---------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-38	5-15
	8-40	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0	100	100	90-100	85-98	25-50	5-25
	40-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-7-6, A-6	0	0	95-100	90-100	75-100	55-90	25-50	5-25
TakC:												
Tapawingo-------	0-4	Silt loam------	CL, ML, CL-ML	A-4, A-6	0-1	0-2	95-100	90-100	80-100	65-90	22-40	1-17
	4-16	Silty clay loam, silt loam, loam.	CL, CL-ML, ML	A-6, A-4, A-7-6	0-1	0-3	95-100	90-100	75-100	55-90	22-50	1-27
	16-38	Silty clay loam, silt loam, loam.	CL, ML, CL-ML	A-6, A-4, A-7-6	0-1	1-5	95-100	90-100	75-100	55-90	22-50	1-27
	38-80	Silty clay loam, silt loam, channery silty clay loam.	CL	A-6, A-7-6	0-5	2-10	65-100	60-95	55-95	50-90	30-50	8-25
TakD:												
Tapawingo-------	0-4	Silt loam------	CL-ML, CL, ML	A-4, A-6	0-1	0-2	95-100	90-100	80-100	65-90	22-40	1-17
	4-14	Silty clay loam, silt loam, loam.	CL, CL-ML, ML	A-4, A-6, A-7-6	0-1	0-3	95-100	90-100	75-100	55-90	22-50	1-27
	14-30	Silty clay loam, silt loam, loam.	CL, ML, CL-ML	A-4, A-6, A-7-6	0-1	1-5	95-100	90-100	75-100	55-90	22-50	1-27
	30-80	Silty clay loam, silt loam, channery silty clay loam.	CL	A-6, A-7-6	0-5	2-10	65-100	60-95	55-95	50-90	30-50	8-25
TckA, TckB:												
Tobinsport------	0-9	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-95	22-40	NP-17
	9-27	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	85-95	23-45	2-24
	27-52	Loam, fine sandy loam, very fine sandy loam.	ML, CL, SC, SM	A-4	0	0	100	100	70-95	40-75	15-28	3-9
	52-80	Loamy fine sand, very fine sandy loam, fine sandy loam.	CL-ML, ML, SM, SC-SM	A-2-4, A-4	0	0	100	100	75-95	20-65	0-22	NP-7
Uaa.												
Udorthents												
UabBK:												
Udipsamments----	0-5	Sandy loam-----	SC, SC-SM, SM	A-2-4, A-4	0	0	100	100	80-95	30-40	5-25	NP-10
	5-80	Sand, fine sand	SM, SP-SM, SP	A-2-4, A-3	0	0	100	100	70-95	3-15	0-0	NP

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Uas:												
Udorthents.												
Pits, quarries.												
UddD:												
Urban land.												
Alford----------	0-6	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	23-40	3-15
	6-72	Silty clay loam, silt loam.	CL	A-4, A-7-6, A-6	0	0	100	100	95-100	90-100	25-50	8-32
	72-80	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-100	15-40	3-20
UehB:												
Urban land.												
Elkinsville-----	0-8	Silt loam------	CL-ML, CL, ML	A-4, A-6	0	0	100	100	90-100	75-95	22-40	2-15
	8-34	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-7, A-6	0	0	100	100	90-100	75-95	25-50	5-28
	34-60	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0	0	95-100	90-100	70-100	35-80	24-38	7-14
	60-80	Loam, sandy loam, clay loam.	CL, SC-SM, CL-ML, SC	A-2-6, A-2-4, A-4, A-6	0	0	95-100	90-100	55-100	25-80	22-35	5-12
Hatfield--------	0-7	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	85-100	75-95	22-39	2-15
	7-20	Silt loam------	CL, ML, CL-ML	A-4, A-6	0	0	90-100	90-100	85-100	75-95	24-40	3-18
	20-36	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	90-100	90-100	85-100	75-95	26-50	5-26
	36-78	Silt loam, silty clay loam, loam.	CL	A-4, A-6, A-7-6	0	0	90-100	90-100	75-100	55-95	24-44	8-24
	78-83	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	90-100	90-100	75-100	55-95	20-44	5-24
UffY.												
Urban land												
WaaAH:												
Wakeland--------	0-7	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	90-100	80-100	16-28	3-9
	7-29	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	90-100	80-100	16-28	3-9
	29-60	Silt loam, loam	CL, ML, CL-ML	A-4	0	0	100	100	85-100	60-100	16-28	3-9
WokAH:												
Wilbur----------	0-7	Silt loam------	CL, ML, CL-ML	A-4	0	0	100	100	95-100	70-100	20-30	3-10
	7-32	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	95-100	80-100	20-30	3-10
	32-60	Silt loam, loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	80-100	60-100	20-35	3-15
WprAH:												
Wirt------------	0-8	Loam-----------	CL-ML, ML	A-4	0	0	98-100	95-100	80-95	60-75	14-24	2-7
	8-38	Silt loam, loam, sandy loam.	CL-ML, ML, SM, SC-SM	A-2-4, A-4	0	0	95-100	90-100	55-100	30-85	12-24	1-7
	38-60	Loam, sandy loam, loamy sand.	CL-ML, SM, ML, SC-SM	A-2-4, A-1-b, A-4	0	0	95-100	90-100	45-95	15-75	0-24	NP-7

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WrlAH:												
Woodmere--------	0-10	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	75-100	35-50	11-24
	10-30	Silty clay loam, silt loam.	CL	A-4, A-7, A-6	0	0	100	100	95-100	85-95	25-50	8-24
	30-42	Silty clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	95-100	90-100	37-60	15-35
	42-80	Silty clay loam, clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	90-100	75-100	35-60	15-35
ZcaA:												
Zipp----------	0-10	Silty clay-----	CH, CL	A-7	0	0	100	100	95-100	85-100	41-65	16-39
	10-45	Silty clay, silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	80-100	42-62	20-37
	45-60	Silty clay, silty clay loam.	CH, CL	A-6, A-7	0	0	100	100	95-100	80-100	35-54	15-32

Table 18.--Physical Properties of the Soils

(Entries under "Erosion factors—T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data was not available or was not estimated.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
AbvD2:												
Adyeville	0-9	5-18	1.20-1.40	0.60-2.00	0.17-0.22	Low	1.0-4.0	.49	.55	3	5	56
	9-24	5-18	1.40-1.60	0.60-2.00	0.09-0.21	Low	0.0-0.5	.24	.43	---	---	---
	24-60	---	---	0.00-0.60	---	---	---	---	---	---	---	---
Wellston	0-8	13-27	1.20-1.55	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	6	48
	8-26	18-35	1.40-1.65	0.60-2.00	0.17-0.21	Moderate	0.0-1.0	.55	.55	---	---	---
	26-41	15-30	1.30-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	.32	.49	---	---	---
	41-54	15-30	1.30-1.60	0.60-2.00	0.06-0.16	Low	0.0-0.5	.20	.43	---	---	---
	54-60	---	---	0.00-0.60	---	---	0.0-0.0	---	---	---	---	---
Deuchars	0-10	15-22	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	6	48
	10-30	24-35	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.49	.49	---	---	---
	30-55	35-55	1.45-1.65	0.06-0.20	0.06-0.15	High	0.0-0.5	.24	.28	---	---	---
	55-62	40-50	1.45-1.60	0.06-0.20	0.06-0.15	High	0.0-0.5	.28	.32	---	---	---
	62-80	---	---	0.00-0.02	---	---	---	---	---	---		
AbvD3:												
Adyeville	0-3	5-18	1.20-1.40	0.60-2.00	0.17-0.22	Low	0.5-2.0	.49	.55	2	5	56
	3-24	5-18	1.40-1.60	0.60-2.00	0.09-0.21	Low	0.0-0.5	.24	.43	---	---	---
	24-60	---	---	0.00-0.60	---	---	---	---	---	---	---	---
Wellston	0-3	20-27	1.20-1.55	0.60-2.00	0.18-0.24	Low	0.5-2.0	.49	.49	3	6	48
	3-22	18-35	1.40-1.65	0.60-2.00	0.17-0.21	Moderate	0.0-1.0	.55	.55	---	---	---
	22-33	15-30	1.30-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	.32	.49	---	---	---
	33-50	15-30	1.30-1.60	0.60-2.00	0.06-0.16	Low	0.0-0.5	.20	.43	---	---	---
	50-60	---	---	0.00-0.60	---	---	0.0-0.0	---	---	---	---	---
Deuchars	0-3	20-27	1.30-1.60	0.60-2.00	0.18-0.24	Low	0.5-2.0	.49	.49	3	6	48
	3-24	24-35	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.49	.49	---	---	---
	24-55	35-55	1.45-1.65	0.06-0.20	0.06-0.15	High	0.0-0.5	.24	.28	---	---	---
	55-62	40-50	1.45-1.60	0.06-0.20	0.06-0.15	High	0.0-0.5	.28	.32	---	---	---
	62-80	---	---	0.00-0.02	---	---	---	---	---	---	---	---
AccG:												
Adyeville	0-9	5-18	1.30-1.50	0.60-2.00	0.17-0.22	Low	1.0-4.0	.43	.49	3	3	86
	9-24	5-18	1.40-1.60	0.60-2.00	0.09-0.21	Low	0.0-0.5	.24	.43	---	---	---
	24-60	---	---	0.00-0.60	---	---	---	---	---	---	---	---
Tipsaw	0-5	5-18	1.30-1.60	2.00-6.00	0.17-0.22	Low	2.0-4.0	.24	.43	3	3	86
	5-28	8-18	1.40-1.60	0.60-6.00	0.06-0.13	Low	0.0-0.5	.28	.55	---	---	---
	28-60	---	---	0.00-0.60	---	---	---	---	---	---	---	---
Ebal	0-5	12-26	1.20-1.50	0.60-2.00	0.16-0.24	Low	2.0-5.0	.28	.43	4	6	48
	5-9	18-34	1.40-1.60	0.60-2.00	0.09-0.24	Moderate	0.0-1.0	.20	.49	---	---	---
	9-20	40-50	1.40-1.65	0.20-0.60	0.07-0.13	Moderate	0.0-1.0	.10	.28	---	---	---
	20-67	45-65	1.40-1.55	0.01-0.06	0.09-0.13	High	0.0-0.5	.24	.28	---	---	---
	67-80	---	---	0.00-0.01	---	---	---	---	---	---	---	---
AcuF:												
Alford	0-5	12-26	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	5-61	22-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.49	.49	---	---	---
	61-80	12-22	1.30-1.45	0.60-2.00	0.18-0.22	Low	0.0-0.5	.55	.55	---	---	---

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
AfzG:												
Alvin	0-5	8-15	1.35-1.65	2.00-6.00	0.18-0.21	Low	1.0-2.0	.32	.32	5	5	56
	5-12	10-15	1.45-1.65	2.00-6.00	0.10-0.17	Low	0.0-0.5	.17	.17	---	---	---
	12-38	15-22	1.40-1.65	2.00-6.00	0.14-0.18	Low	0.0-0.5	.17	.17	---	---	---
	38-80	3-10	1.45-1.65	2.00-6.00	0.10-0.15	Low	0.0-0.5	.15	.15	---	---	---
Tobinsport	0-9	12-20	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.37	.37	5	5	56
	9-27	22-32	1.40-1.70	0.60-2.00	0.14-0.21	Moderate	0.5-1.0	.43	.43	---	---	---
	27-52	15-22	1.40-1.65	0.60-2.00	0.12-0.14	Low	0.0-0.5	.43	.43	---	---	---
	52-80	5-18	1.55-1.70	6.00-20.00	0.07-0.10	Low	0.0-0.5	.28	.28	---	---	---
AgrA:												
Apalona	0-9	12-22	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.55	.55	4	5	56
	9-30	18-30	1.40-1.65	0.60-2.00	0.14-0.21	Moderate	0.0-0.5	.55	.55	---	---	---
	30-54	16-30	1.55-1.80	0.01-0.06	0.06-0.08	Low	0.0-0.5	.55	.55	---	---	---
	54-75	35-65	1.35-1.65	0.01-0.20	0.06-0.08	High	0.0-0.5	.24	.32	---	---	---
	75-90	15-35	1.40-1.70	0.01-0.20	0.06-0.08	Moderate	0.0-0.5	.37	.55	---	---	---
	90-99	---	---	0.00-0.06	---	---	---	---	---	---	---	---
AgrB, AgrC2:												
Apalona	0-8	12-22	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.55	.55	4	5	56
	8-25	18-30	1.40-1.65	0.60-2.00	0.14-0.21	Moderate	0.0-0.5	.55	.55	---	---	---
	25-49	16-30	1.55-1.80	0.01-0.06	0.06-0.08	Low	0.0-0.5	.55	.55	---	---	---
	49-69	35-65	1.35-1.65	0.01-0.20	0.06-0.08	High	0.0-0.5	.24	.32	---	---	---
	69-90	15-35	1.40-1.70	0.01-0.20	0.06-0.08	Moderate	0.0-0.5	.37	.55	---	---	---
	90-99	---	---	0.00-0.06	---	---	---	---	---	---	---	---
AgrC3:												
Apalona	0-4	20-27	1.20-1.65	0.60-2.00	0.18-0.22	Low	0.5-2.0	.49	.49	3	6	48
	4-20	18-30	1.40-1.65	0.60-2.00	0.14-0.21	Moderate	0.0-0.5	.55	.55	---	---	---
	20-39	16-30	1.55-1.80	0.01-0.06	0.06-0.08	Low	0.0-0.5	.55	.55	---	---	---
	39-71	35-65	1.35-1.65	0.01-0.20	0.06-0.08	High	0.0-0.5	.24	.32	---	---	---
	71-90	15-35	1.40-1.70	0.01-0.20	0.06-0.08	Moderate	0.0-0.5	.37	.55	---	---	---
	90-99	---	---	0.00-0.06	---	---	---	---	---	---	---	---
BkeC2:												
Bloomfield	0-4	5-10	1.45-1.65	6.00-20.00	0.09-0.13	Low	0.5-1.5	.10	.10	5	2	134
	4-17	2-10	1.45-1.65	6.00-20.00	0.08-0.12	Low	0.0-1.0	.15	.15	---	---	---
	17-80	5-13	1.60-1.80	2.00-20.00	0.08-0.12	Low	0.0-1.0	.10	.10	---	---	---
Alvin	0-11	8-15	1.35-1.65	2.00-6.00	0.18-0.21	Low	0.5-1.5	.32	.32	5	5	56
	11-15	10-15	1.45-1.65	2.00-6.00	0.10-0.17	Low	0.0-0.5	.17	.17	---	---	---
	15-60	15-22	1.40-1.65	2.00-6.00	0.14-0.18	Low	0.0-0.5	.17	.17	---	---	---
	60-80	3-10	1.45-1.65	2.00-6.00	0.10-0.15	Low	0.0-0.5	.15	.15	---	---	---
BodAH:												
Bonnie	0-10	18-27	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	6	48
	10-40	18-27	1.30-1.65	0.20-0.60	0.18-0.22	Low	0.0-0.5	.49	.49	---	---	---
	40-60	18-30	1.35-1.65	0.20-0.60	0.14-0.18	Low	0.0-0.5	.49	.49	---	---	---
BodAM:												
Bonnie	0-4	18-27	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	6	48
	4-22	18-27	1.40-1.60	0.20-0.60	0.20-0.22	Low	0.0-0.5	.49	.49	---	---	---
	22-60	18-27	1.45-1.65	0.20-0.60	0.20-0.22	Low	0.0-0.5	.49	.49	---	---	---
CndAH:												
Combs	0-16	12-18	1.20-1.50	0.60-6.00	0.20-0.22	Low	2.0-4.0	.28	.28	5	5	56
	16-49	12-20	1.20-1.50	0.60-6.00	0.14-0.20	Low	1.0-1.5	.37	.37	---	---	---
	49-80	12-26	1.20-1.50	0.60-6.00	0.14-0.19	Low	0.5-1.5	.37	.37	---	---	---

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
CwaAH:												
Cuba	0-8	12-24	1.30-1.55	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	8-30	18-26	1.30-1.50	0.60-2.00	0.17-0.22	Low	0.5-1.0	.49	.49	---	---	---
	30-60	8-26	1.35-1.60	0.60-6.00	0.10-0.22	Low	0.0-0.5	.43	.55	---	---	---
DduC2:												
Deuchars	0-10	15-22	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	6	48
	10-30	24-35	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.49	.49	---	---	---
	30-55	35-55	1.45-1.65	0.06-0.20	0.06-0.15	High	0.0-0.5	.24	.28	---	---	---
	55-62	40-50	1.45-1.60	0.06-0.20	0.06-0.15	High	0.0-0.5	.28	.32	---	---	---
	62-80	---	---	0.00-0.02	---	---	---	---	---	---	---	---
EabD2:												
Ebal	0-7	12-26	1.20-1.50	0.60-2.00	0.16-0.24	Low	1.0-3.0	.32	.49	4	6	48
	7-13	18-34	1.40-1.60	0.60-2.00	0.09-0.24	Moderate	0.0-1.0	.20	.49	---	---	---
	13-21	40-50	1.40-1.65	0.20-0.60	0.07-0.13	Moderate	0.0-1.0	.10	.28	---	---	---
	21-80	45-65	1.40-1.55	0.01-0.06	0.09-0.13	High	0.0-0.5	.24	.28	---	---	---
	80-90	---	---	0.00-0.01	---	---	---	---	---	---	---	---
Deuchars	0-10	15-22	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	6	48
	10-30	24-35	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.49	.49	---	---	---
	30-55	35-55	1.45-1.65	0.06-0.20	0.06-0.15	High	0.0-0.5	.24	.28	---	---	---
	55-62	40-50	1.45-1.60	0.06-0.20	0.06-0.15	High	0.0-0.5	.28	.32	---	---	---
	62-80	---	---	0.00-0.02	---	---	---	---	---	---	---	---
Kitterman	0-4	30-40	1.40-1.60	0.20-0.60	0.16-0.26	Moderate	2.0-10	.17	.32	3	4	86
	4-26	60-70	1.40-1.55	0.06-0.20	0.07-0.16	High	0.5-2.0	.10	.17	---	---	---
	26-35	40-70	1.40-1.60	0.06-0.20	0.02-0.11	High	0.5-1.0	.15	.20	---	---	---
	35-60	---	---	0.00-0.06	---	---	---	---	---	---	---	---
EabD3:												
Ebal	0-3	27-34	1.40-1.55	0.60-2.00	0.14-0.22	Moderate	0.5-2.0	.32	.49	3	7	38
	3-9	18-34	1.40-1.60	0.60-2.00	0.09-0.24	Moderate	0.0-1.0	.20	.49	---	---	---
	9-17	40-50	1.40-1.65	0.20-0.60	0.07-0.13	Moderate	0.0-1.0	.10	.28	---	---	---
	17-67	45-65	1.40-1.55	0.01-0.06	0.09-0.13	High	0.0-0.5	.24	.28	---	---	---
	67-80	---	---	0.00-0.01	---	---	---	---	---	---	---	---
Deuchars	0-5	20-27	1.30-1.60	0.60-2.00	0.18-0.24	Low	0.5-2.0	.49	.49	3	6	48
	5-24	24-35	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.49	.49	---	---	---
	24-55	35-55	1.45-1.65	0.06-0.20	0.06-0.15	High	0.0-0.5	.24	.28	---	---	---
	55-62	40-50	1.45-1.60	0.06-0.20	0.06-0.15	High	0.0-0.5	.28	.32	---	---	---
	62-80	---	---	0.00-0.02	---	---	---	---	---	---	---	---
Kitterman	0-2	30-40	1.40-1.60	0.20-0.60	0.16-0.26	Moderate	2.0-5.0	.17	.32	2	4	86
	2-22	60-70	1.40-1.55	0.06-0.20	0.07-0.16	High	0.5-2.0	.10	.17	---	---	---
	22-27	40-70	1.40-1.60	0.06-0.20	0.02-0.11	High	0.5-1.0	.15	.20	---	---	---
	27-60	---	---	0.00-0.06	---	---	---	---	---	---	---	---
EemAQ:												
Elk	0-8	10-27	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	8-49	15-27	1.40-1.60	0.60-2.00	0.16-0.22	Low	0.5-1.0	.43	.43	---	---	---
	49-62	15-27	1.40-1.60	0.60-2.00	0.15-0.22	Low	0.0-0.5	.37	.43	---	---	---
	62-80	15-27	1.40-1.60	0.20-2.00	0.12-0.20	Low	0.0-0.5	.24	.32	---	---	---
EesA, EesAQ:												
Elkinsville	0-8	8-18	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	8-38	18-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.43	.43	---	---	---
	38-65	20-30	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
	65-80	16-28	1.40-1.60	0.60-2.00	0.12-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
Millstone	0-12	12-20	1.25-1.55	0.60-2.00	0.17-0.22	Low	1.0-3.0	.43	.49	5	5	56
	12-65	18-28	1.40-1.60	0.60-2.00	0.14-0.19	Low	0.0-1.0	.43	.49	---	---	---
	65-80	10-20	1.40-1.70	0.60-2.00	0.09-0.19	Low	0.0-0.5	.28	.55	---	---	---

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
EesD2, EesDQ:												
Elkinsville	0-6	8-18	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	6-28	18-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.43	.43	---	---	---
	28-54	20-30	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
	54-80	16-28	1.40-1.60	0.60-2.00	0.12-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
Millstone	0-7	12-20	1.25-1.55	0.60-2.00	0.17-0.22	Low	1.0-3.0	.43	.49	5	5	56
	7-56	18-28	1.40-1.60	0.60-2.00	0.14-0.19	Low	0.0-1.0	.43	.49	---	---	---
	56-80	10-20	1.40-1.70	0.60-2.00	0.09-0.19	Low	0.0-0.5	.28	.55	---	---	---
EesFQ:												
Elkinsville	0-5	8-18	1.30-1.60	0.60-2.00	0.18-0.24	Low	2.0-3.0	.43	.43	5	5	56
	5-24	18-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.43	.43	---	---	---
	24-50	20-30	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
	50-80	16-28	1.40-1.60	0.60-2.00	0.12-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
Millstone	0-6	12-20	1.25-1.55	0.60-2.00	0.17-0.22	Low	2.0-3.0	.32	.37	5	5	56
	6-54	18-28	1.40-1.60	0.60-2.00	0.14-0.19	Low	0.0-1.0	.43	.49	---	---	---
	54-80	10-20	1.40-1.70	0.60-2.00	0.09-0.19	Low	0.0-0.5	.28	.55	---	---	---
GacAW:												
Gatchel	0-4	10-20	1.35-1.50	0.06-6.00	0.18-0.22	Low	1.0-3.0	.24	.28	3	5	56
	4-18	10-20	1.50-1.65	2.00-6.00	0.15-0.19	Low	0.5-1.0	.17	.24	---	---	---
	18-60	10-20	1.60-1.80	6.00-20.00	0.02-0.11	Low	0.0-0.5	.17	.20	---	---	---
GhaA:												
Ginat	0-9	12-20	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.55	.55	5	5	56
	9-32	20-30	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-0.5	.55	.55	---	---	---
	32-46	22-34	1.45-1.60	0.20-0.60	0.14-0.21	Moderate	0.0-0.5	.55	.55	---	---	---
	46-80	24-42	1.45-1.60	0.06-0.20	0.12-0.18	Moderate	0.0-0.5	.37	.43	---	---	---
HbhA:												
Hartz	0-9	10-22	1.25-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	5	5	56
	9-65	22-33	1.40-1.70	0.20-2.00	0.14-0.21	Moderate	0.0-0.5	.49	.49	---	---	---
	65-75	27-48	1.40-1.70	0.06-0.60	0.11-0.20	Moderate	0.0-0.5	.37	.37	---	---	---
	75-80	24-48	1.35-1.65	0.06-0.60	0.11-0.20	Moderate	0.0-0.5	.43	.43	---	---	---
HcaA:												
Hatfield	0-7	12-22	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.55	4	5	56
	7-20	20-27	1.40-1.60	0.60-2.00	0.15-0.21	Low	0.5-1.0	.49	.55	---	---	---
	20-36	24-34	1.50-1.70	0.06-0.60	0.14-0.21	Moderate	0.0-0.5	.43	.49	---	---	---
	36-78	24-32	1.55-1.75	0.01-0.06	0.06-0.12	Low	0.0-0.5	.49	.55	---	---	---
	78-83	20-32	1.50-1.70	0.01-0.20	0.06-0.12	Low	0.0-0.5	.49	.55	---	---	---
HcbAQ:												
Hatfield	0-10	27-32	1.40-1.55	0.60-2.00	0.17-0.23	Low	1.0-3.0	.37	.43	4	7	38
	10-32	27-34	1.50-1.70	0.06-0.60	0.14-0.21	Moderate	0.5-1.0	.43	.49	---	---	---
	32-64	24-32	1.55-1.75	0.01-0.60	0.06-0.12	Low	0.0-0.5	.49	.55	---	---	---
	64-80	20-32	1.50-1.70	0.01-0.20	0.06-0.12	Low	0.0-0.5	.49	.55	---	---	---
HcgAH, HcgAQ:												
Haymond	0-10	10-20	1.30-1.50	0.60-2.00	0.20-0.24	Low	1.0-3.0	.43	.43	5	5	56
	10-44	10-18	1.30-1.50	0.60-2.00	0.20-0.24	Low	0.5-2.0	.55	.55	---	---	---
	44-60	5-26	1.30-1.50	0.60-2.00	0.14-0.22	Low	0.0-1.0	.43	.49	---	---	---
HsaB2:												
Hosmer	0-8	10-24	1.20-1.60	0.60-2.00	0.18-0.24	Low	1.0-2.0	.55	.55	4	5	56
	8-30	22-30	1.40-1.70	0.60-2.00	0.15-0.21	Moderate	0.0-1.0	.55	.55	---	---	---
	30-63	18-28	1.55-1.80	0.01-0.06	0.06-0.08	Low	0.0-0.5	.55	.55	---	---	---
	63-80	15-26	1.50-1.70	0.01-0.20	0.06-0.08	Low	0.0-0.5	.55	.55	---	---	---

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
HubAH:												
Huntington	0-12	27-32	1.20-1.50	0.60-2.00	0.20-0.24	Low	3.0-5.0	.32	.32	5	7	38
	12-70	24-34	1.40-1.55	0.60-2.00	0.18-0.22	Low	0.5-1.5	.43	.43	---	---	---
	70-80	15-30	1.40-1.55	0.60-2.00	0.14-0.20	Low	0.0-1.0	.37	.37	---	---	---
JoaA:												
Johnsburg	0-10	12-20	1.30-1.65	0.60-2.00	0.18-0.24	Low	1.0-2.0	.55	.55	4	5	56
	10-36	22-32	1.40-1.65	0.60-2.00	0.14-0.21	Moderate-	0.0-0.5	.55	.55	---	---	---
	36-72	22-30	1.55-1.80	0.01-0.06	0.06-0.08	Low	0.0-0.5	.49	.55	---	---	---
	72-90	14-30	1.50-1.70	0.01-0.06	0.06-0.08	Low	0.0-0.5	.37	.49	---	---	---
	90-99	---	---	0.00-0.20	---	---	---	---	---	---	---	---
JoeG:												
Jubin	0-4	8-18	1.20-1.50	2.00-6.00	0.08-0.14	Low	3.0-6.0	.10	.32	5	5	56
	4-24	8-18	1.20-1.50	2.00-6.00	0.02-0.12	Low	0.5-2.0	.05	.37	---	---	---
	24-80	8-18	1.20-1.50	2.00-6.00	0.02-0.12	Low	0.0-0.5	.05	.37	---	---	---
Branchville	0-3	15-25	1.20-1.50	0.60-2.00	0.13-0.19	Low	3.0-6.0	.15	.24	4	5	56
	3-23	15-25	1.20-1.50	0.60-2.00	0.03-0.14	Low	1.0-3.0	.05	.32	---	---	---
	23-29	25-35	1.35-1.55	0.60-2.00	0.06-0.16	Moderate-	0.0-0.5	.10	.32	---	---	---
	29-55	40-70	1.40-1.55	0.06-0.20	0.07-0.13	High	0.0-0.5	.20	.24	---	---	---
	55-80	40-70	1.40-1.55	0.06-0.20	0.02-0.09	High	0.0-0.5	.32	.32	---	---	---
Rock outcrop.												
LeaA:												
Lauer	0-8	12-20	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-2.0	.49	.49	5	5	56
	8-54	24-34	1.40-1.70	0.20-2.00	0.14-0.21	Moderate-	0.0-0.5	.49	.49	---	---	---
	54-63	35-50	1.45-1.70	0.06-0.20	0.12-0.19	High	0.0-0.5	.37	.37	---	---	---
	63-80	24-45	1.45-1.65	0.06-0.20	0.10-0.19	Moderate-	0.0-0.5	.43	.43	---	---	---
McgC2:												
Markland	0-6	20-27	1.30-1.55	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	4	6	48
	6-25	35-55	1.55-1.65	0.20-0.60	0.12-0.18	High	0.5-1.0	.28	.28	---	---	
	25-42	35-55	1.55-1.65	0.06-0.60	0.12-0.18	High	0.5-1.0	.43	.43	---	---	---
	42-80	20-50	1.50-1.65	0.06-0.60	0.12-0.22	Moderate-	0.5-1.0	.49	.49	---	---	---
McnGQ:												
Markland	0-4	20-27	1.30-1.55	0.60-2.00	0.18-0.24	Low	2.0-5.0	.37	.37	4	6	48
	4-28	35-55	1.55-1.65	0.20-0.60	0.12-0.18	High	0.5-1.0	.28	.28	---	---	---
	28-59	35-55	1.55-1.65	0.06-0.60	0.12-0.18	High	0.5-1.0	.43	.43	---	---	---
	59-80	20-50	1.50-1.65	0.06-0.60	0.12-0.22	Moderate-	0.5-1.0	.49	.49	---	---	---
McpC3:												
Markland	0-4	27-35	1.40-1.60	0.60-2.00	0.16-0.21	Moderate-	0.5-2.0	.43	.43	3	7	38
	4-20	35-55	1.55-1.65	0.20-0.60	0.12-0.18	High	0.5-1.0	.28	.28	---	---	---
	20-42	35-55	1.55-1.65	0.06-0.60	0.12-0.18	High	0.5-1.0	.43	.43	---	---	---
	42-80	20-50	1.50-1.65	0.06-0.60	0.12-0.22	Moderate-	0.5-1.0	.49	.49	---	---	---
McuDQ:												
Markland	0-4	27-35	1.40-1.60	0.60-2.00	0.16-0.21	Moderate-	0.5-2.0	.43	.43	3	7	38
	4-18	35-55	1.55-1.65	0.20-0.60	0.12-0.18	High	0.5-1.0	.28	.28	---	---	---
	18-40	35-55	1.55-1.65	0.06-0.60	0.12-0.18	High	0.5-1.0	.43	.43	---	---	---
	40-80	20-50	1.50-1.65	0.06-0.60	0.12-0.22	Moderate-	0.5-1.0	.49	.49	---	---	---
MhkAH:												
McAdoo	0-10	27-32	1.25-1.50	0.60-2.00	0.21-0.23	Moderate-	2.0-3.0	.43	.43	5	7	38
	10-48	20-32	1.30-1.50	0.60-2.00	0.18-0.22	Moderate-	1.0-2.0	.43	.43	---	---	---
	48-60	7-35	1.35-1.55	0.60-2.00	0.17-0.22	Moderate-	0.5-2.0	.43	.43	---	---	---

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
MhuA:												
McGary	0-11	20-27	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	6	48
	11-42	40-50	1.45-1.60	0.06-0.60	0.11-0.18	High	0.0-1.0	.37	.37	---	---	---
	42-50	40-50	1.45-1.60	0.01-0.20	0.11-0.18	High	0.0-0.5	.28	.28	---	---	---
	50-60	35-50	1.50-1.65	0.01-0.06	0.11-0.18	Moderate	0.0-0.5	.32	.32	---	---	---
MsbB, MsbBQ:												
Millstone	0-10	12-20	1.25-1.55	0.60-2.00	0.17-0.22	Low	1.0-3.0	.43	.49	5	5	56
	10-62	18-28	1.40-1.60	0.60-2.00	0.14-0.19	Low	0.0-1.0	.43	.49	---	---	---
	62-80	10-20	1.40-1.70	0.60-2.00	0.09-0.19	Low	0.0-0.5	.28	.55	---	---	---
Elkinsville	0-8	8-18	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	8-34	18-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.43	.43	---	---	
	34-60	20-30	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
	60-80	16-28	1.40-1.60	0.60-2.00	0.12-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
MsbC2, MsbCQ:												
Millstone	0-8	12-20	1.25-1.55	0.60-2.00	0.17-0.22	Low	1.0-3.0	.43	.49	5	5	56
	8-58	18-28	1.40-1.60	0.60-2.00	0.14-0.19	Low	0.0-1.0	.43	.49	---	---	---
	58-80	10-20	1.40-1.70	0.60-2.00	0.09-0.19	Low	0.0-0.5	.28	.55	---	---	---
Elkinsville	0-7	8-18	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	7-30	18-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.43	.43	---	---	---
	30-56	20-30	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
	56-80	16-28	1.40-1.60	0.60-2.00	0.12-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
NbgAH:												
Newark	0-11	27-35	1.20-1.60	0.60-2.00	0.20-0.23	Low	2.0-4.0	.37	.37	5	7	38
	11-51	18-35	1.20-1.60	0.60-2.00	0.16-0.22	Low	0.5-2.0	.43	.43	---	---	---
	51-60	12-40	1.30-1.65	0.60-2.00	0.14-0.20	Low	0.0-1.0	.49	.49	---	---	---
PhwA:												
Percell	0-9	12-22	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	5	5	56
	9-56	22-30	1.40-1.70	0.20-2.00	0.14-0.21	Moderate	0.0-0.5	.49	.49	---	---	---
	56-79	27-48	1.45-1.70	0.06-0.60	0.12-0.19	High	0.0-0.5	.37	.37	---	---	---
	79-90	22-48	1.45-1.65	0.06-0.60	0.10-0.19	Moderate	0.0-0.5	.43	.43	---	---	---
PhwB2:												
Percell	0-8	12-22	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	5	5	56
	8-49	22-30	1.40-1.70	0.20-2.00	0.14-0.21	Moderate	0.0-0.5	.49	.49	---	---	---
	49-70	27-48	1.45-1.70	0.06-0.60	0.12-0.19	High	0.0-0.5	.37	.37	---	---	---
	70-80	22-48	1.45-1.65	0.06-0.60	0.10-0.19	Moderate	0.0-0.5	.43	.43	---	---	---
PhwB2:												
Percell	0-8	12-22	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	5	5	56
	8-49	22-30	1.40-1.70	0.20-2.00	0.14-0.21	Moderate	0.0-0.5	.49	.49	---	---	---
	49-70	27-48	1.45-1.70	0.06-0.60	0.12-0.19	High	0.0-0.5	.37	.37	---	---	---
	70-80	22-48	1.45-1.65	0.06-0.60	0.10-0.19	Moderate	0.0-0.5	.43	.43	---	---	---
PkaAH:												
Petrolia	0-8	27-35	1.20-1.60	0.20-0.60	0.18-0.23	Moderate	2.0-3.0	.37	.37	5	7	38
	8-30	27-35	1.35-1.55	0.20-0.60	0.16-0.20	Moderate	0.0-1.0	.43	.43	---	---	---
	30-80	20-35	1.40-1.60	0.20-0.60	0.14-0.20	Moderate	0.0-1.0	.43	.43	---	---	---
PsmA:												
Princeton	0-8	10-20	1.35-1.50	0.60-2.00	0.16-0.22	Low	0.5-2.0	.32	.32	5	5	56
	8-41	18-25	1.45-1.60	0.60-2.00	0.16-0.19	Low	0.0-1.0	.28	.28	---	---	---
	41-60	8-18	1.40-1.65	2.00-6.00	0.10-0.17	Low	0.0-0.5	.20	.20	---	---	---
	60-80	4-10	1.50-1.75	2.00-6.00	0.06-0.12	Low	0.0-0.5	.15	.15	---	---	---

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
RatAH:												
Rahm	0-8	27-34	1.30-1.60	0.60-2.00	0.18-0.23	Moderate-	1.0-3.0	.43	.43	5	7	38
	8-24	24-34	1.40-1.70	0.60-2.00	0.18-0.22	Moderate-	0.5-2.0	.49	.49	---	---	---
	24-51	30-42	1.40-1.70	0.06-0.20	0.12-0.18	Moderate-	0.0-1.0	.43	.43	---	---	---
	51-80	30-42	1.40-1.70	0.06-0.20	0.12-0.18	Moderate-	0.0-1.0	.37	.37	---	---	---
RgvB:												
Rickert	0-9	12-20	1.25-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	5	5	56
	9-54	20-30	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.55	.55	---	---	---
	54-80	12-26	1.50-1.65	0.20-0.60	0.11-0.14	Low	0.0-0.5	.55	.55	---	---	---
Alford	0-9	12-20	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	9-72	22-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.49	.49	---	---	---
	72-80	12-22	1.30-1.45	0.60-2.00	0.18-0.22	Low	0.0-0.5	.55	.55	---	---	---
RgvC2:												
Rickert	0-8	12-20	1.25-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	5	5	56
	8-49	20-30	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.55	.55	---	---	---
	49-80	12-26	1.50-1.65	0.20-0.60	0.11-0.14	Low	0.0-0.5	.55	.55	---	---	---
Alford	0-6	12-20	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	6-72	22-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.49	.49	---	---	---
	72-80	12-22	1.30-1.45	0.60-2.00	0.18-0.22	Low	0.0-0.5	.55	.55	---	---	---
RgvC3:												
Rickert	0-6	20-27	1.25-1.65	0.60-2.00	0.18-0.24	Low	0.5-2.0	.49	.49	4	6	48
	6-42	20-30	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.55	.55	---	---	---
	42-80	12-26	1.50-1.65	0.20-0.60	0.11-0.14	Low	0.0-0.5	.55	.55	---	---	---
Alford	0-4	20-26	1.30-1.60	0.60-2.00	0.18-0.24	Low	0.5-2.0	.43	.43	4	6	48
	4-72	22-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.49	.49	---	---	---
	72-80	12-22	1.30-1.45	0.60-2.00	0.18-0.22	Low	0.0-0.5	.55	.55	---	---	---
RgvD3:												
Rickert	0-5	20-27	1.25-1.65	0.60-2.00	0.18-0.24	Low	0.5-2.0	.49	.49	4	6	48
	5-42	20-30	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.55	.55	---	---	---
	42-80	12-26	1.50-1.65	0.20-0.60	0.11-0.14	Low	0.0-0.5	.55	.55	---	---	---
Alford	0-4	20-26	1.30-1.60	0.60-2.00	0.18-0.24	Low	0.5-2.0	.43	.43	4	6	48
	4-72	22-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.49	.49	---	---	---
	72-80	12-22	1.30-1.45	0.60-2.00	0.18-0.22	Low	0.0-0.5	.55	.55	---	---	---
RtcB2:												
Ryker	0-6	18-24	1.30-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	6	48
	6-30	22-32	1.40-1.70	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.49	.49	---	---	---
	30-80	22-38	1.40-1.65	0.60-2.00	0.12-0.20	Moderate-	0.0-0.5	.24	.32	---	---	---
RtcC2:												
Ryker	0-6	18-24	1.30-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	6	48
	6-25	22-32	1.40-1.70	0.60-2.00	0.14-0.21	Moderate-	0.0-1.0	.49	.49	---	---	---
	25-80	27-38	1.40-1.65	0.60-2.00	0.12-0.20	Moderate-	0.0-0.5	.24	.32	---	---	---
ScbA, ScbAQ, ScdB, ScdBQ:												
Sciotoville	0-9	12-27	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	5	56
	9-27	20-32	1.40-1.70	0.60-2.00	0.16-0.21	Low	0.5-1.0	.49	.55	---	---	---
	27-50	20-32	1.60-1.80	0.06-0.20	0.06-0.10	Low	0.0-0.5	.43	.49	---	---	---
	50-80	15-32	1.50-1.70	0.06-2.00	0.06-0.10	Low	0.0-0.5	.43	.49	---	---	---
SfyB2:												
Shircliff	0-8	18-27	1.30-1.55	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	6	48
	8-19	24-36	1.40-1.60	0.60-2.00	0.16-0.22	Moderate-	0.5-1.0	.43	.43	---	---	
	19-43	35-60	1.55-1.65	0.06-0.60	0.12-0.18	High	0.0-1.0	.28	.28	---	---	---
	43-80	24-50	1.50-1.65	0.06-0.20	0.12-0.22	Moderate-	0.0-0.5	.37	.37	---	---	---

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
StdAH:												
Stendal	0-8	12-26	1.30-1.55	0.60-2.00	0.22-0.24	Low	1.0-3.0	.43	.43	5	6	48
	8-40	18-34	1.35-1.55	0.60-2.00	0.20-0.22	Low	0.0-1.0	.49	.49	---	---	---
	40-60	15-34	1.35-1.55	0.60-2.00	0.20-0.22	Low	0.0-0.5	.43	.49	---	---	---
TakC:												
Tapawingo	0-4	16-26	1.40-1.65	0.60-2.00	0.18-0.24	Low	0.5-2.0	.43	.49	3	6	48
	4-16	20-34	1.55-1.80	0.01-0.06	0.06-0.10	Moderate	0.5-2.0	.43	.49	---	---	---
	16-38	20-34	1.65-1.80	0.01-0.06	0.06-0.10	Moderate	0.0-1.0	.43	.49	---	---	---
	38-80	24-40	1.50-1.75	0.01-0.20	0.06-0.10	Moderate	0.0-3.0	.32	.49	---	---	---
TakD:												
Tapawingo	0-4	16-26	1.40-1.65	0.60-2.00	0.18-0.24	Low	0.5-2.0	.43	.49	3	6	48
	4-14	20-34	1.55-1.80	0.01-0.06	0.06-0.10	Moderate	0.5-2.0	.43	.49	---	---	---
	14-30	20-34	1.65-1.80	0.01-0.06	0.06-0.10	Moderate	0.0-1.0	.43	.49	---	---	---
	30-80	24-40	1.50-1.75	0.01-0.20	0.06-0.10	Moderate	1.0-3.0	.32	.49	---	---	---
TckA, TckB:												
Tobinsport	0-9	12-20	1.20-1.65	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	9-27	22-32	1.40-1.70	0.60-2.00	0.14-0.21	Moderate	0.5-1.0	.43	.43	---	---	---
	27-52	15-22	1.40-1.65	0.60-2.00	0.12-0.14	Low	0.0-0.5	.43	.43	---	---	---
	52-80	5-18	1.55-1.70	6.00-20.00	0.07-0.10	Low	0.0-0.5	.28	.28	---	---	---
Uaa.												
Udorthents												
UabBK:												
Udipsamments	0-5	8-15	1.45-1.65	2.00-6.00	0.10-0.15	Low	1.0-4.0	.10	.10	5	3	86
	5-80	0-5	1.55-1.75	6.00-20.00	0.05-0.07	Low	0.5-1.0	.05	.05	---	---	---
Uas:												
Udorthents.												
Pits, quarries.												
UddD:												
Urban land.												
Alford	0-6	12-20	1.30-1.60	0.60-2.00	0.18-0.24	Low	0.5-3.0	.43	.43	5	5	56
	6-72	22-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.49	.49	---	---	
	72-80	12-22	1.30-1.45	0.60-2.00	0.18-0.22	Low	0.0-0.5	.55	.55	---	---	---
UehB:												
Urban land.												
Elkinsville	0-8	8-18	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.43	.43	5	5	56
	8-34	18-32	1.40-1.60	0.60-2.00	0.14-0.21	Moderate	0.0-1.0	.43	.43	---	---	---
	34-60	20-30	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
	60-80	16-28	1.40-1.60	0.60-2.00	0.12-0.19	Moderate	0.0-0.5	.28	.32	---	---	---
Hatfield	0-7	12-22	1.30-1.60	0.60-2.00	0.18-0.24	Low	1.0-3.0	.49	.49	4	5	56
	7-20	20-27	1.40-1.60	0.60-2.00	0.15-0.21	Low	0.5-1.0	.49	.49	---	---	---
	20-36	24-34	1.50-1.70	0.06-0.60	0.14-0.21	Moderate	0.0-0.5	.49	.49	---	---	---
	36-78	24-32	1.55-1.75	0.01-0.06	0.06-0.12	Low	0.0-0.5	.49	.49	---	---	---
	78-83	20-32	1.50-1.70	0.01-0.20	0.06-0.12	Low	0.0-0.5	.49	.49	---	---	---
UffY.												
Urban land												

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
W.												
Water												
WaaAH:												
Wakeland	0-7	10-18	1.30-1.60	0.60-2.00	0.20-0.24	Low	1.0-3.0	.49	.49	5	5	56
	7-29	10-18	1.30-1.50	0.60-2.00	0.20-0.24	Low	0.0-1.0	.64	.64	---	---	---
	29-60	10-18	1.30-1.50	0.60-2.00	0.18-0.24	Low	0.0-0.5	.49	.49	---	---	---
WokAH:												
Wilbur	0-7	10-18	1.30-1.50	0.60-2.00	0.20-0.24	Low	1.0-3.0	.43	.43	5	5	56
	7-32	10-18	1.30-1.50	0.60-2.00	0.20-0.24	Low	0.5-2.0	.55	.55	---	---	
	32-60	10-26	1.30-1.50	0.60-2.00	0.18-0.22	Low	0.5-1.0	.49	.49	---	---	---
WprAH:												
Wirt	0-8	10-18	1.30-1.55	0.60-2.00	0.19-0.24	Low	0.5-2.0	.37	.37	5	5	56
	8-38	7-18	1.40-1.55	0.60-2.00	0.11-0.20	Low	0.0-1.0	.32	.37	---	---	
	38-60	4-18	1.45-1.60	0.60-6.00	0.07-0.19	Low	0.0-0.5	.24	.37	---	---	---
WrlAH:												
Woodmere	0-10	27-34	1.30-1.60	0.60-2.00	0.17-0.23	Moderate-	1.0-3.0	.37	.37	5	7	38
	10-30	25-34	1.40-1.60	0.20-2.00	0.18-0.22	Moderate-	0.5-2.0	.43	.43	---	---	---
	30-42	30-42	1.40-1.70	0.20-0.60	0.12-0.18	Moderate-	0.0-0.5	.37	.37	---	---	---
	42-80	30-42	1.50-1.75	0.20-0.60	0.12-0.18	Moderate-	0.0-0.5	.37	.37	---	---	---
ZcaA:												
Zipp	0-10	40-45	1.40-1.55	0.20-0.60	0.12-0.15	High	1.0-3.0	.32	.32	5	4	86
	10-45	35-55	1.55-1.65	0.06-0.20	0.11-0.13	High	0.5-1.5	.32	.32	---	---	---
	45-60	35-50	1.55-1.70	0.01-0.06	0.08-0.12	High	0.0-1.0	.37	.37	---	---	---

Table 19.--Chemical Properties of the Soils

(Absence of an entry indicates that data was not available or was not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
AbvD2:				
Adyeville	0-9	3.0-15.0	3.5-7.3	---
	9-24	3.0-10.0	3.5-5.5	---
	24-60	---	---	---
Wellston	0-8	6.0-16.0	3.5-7.3	---
	8-26	6.0-20.0	3.5-6.0	---
	26-41	6.0-22.0	4.5-5.5	---
	41-54	6.0-20.0	4.5-5.5	---
	54-60	---	---	---
Deuchars	0-10	5.0-15.0	4.5-7.3	---
	10-30	5.0-15.0	3.5-5.5	---
	30-55	15.0-35.0	3.5-6.0	---
	55-62	20.0-35.0	4.5-7.3	---
	62-80	---	---	---
AbvD3:				
Adyeville	0-3	3.0-13.0	3.5-7.3	---
	3-24	3.0-10.0	3.5-5.5	---
	24-60	---	---	---
Wellston	0-3	6.0-16.0	3.5-7.3	---
	3-22	6.0-20.0	3.5-6.0	---
	22-33	6.0-22.0	4.5-5.5	---
	33-50	6.0-20.0	4.5-5.5	---
	50-60	---	---	---
Deuchars	0-3	5.0-15.0	4.5-7.3	---
	3-24	5.0-15.0	3.5-5.5	---
	24-55	15.0-35.0	3.5-6.0	---
	55-62	20.0-35.0	4.5-7.3	---
	62-80	---	---	---
AccG:				
Adyeville	0-9	3.0-10.0	3.5-5.5	---
	9-24	3.0-10.0	3.5-5.5	---
	24-60	---	---	---
Tipsaw	0-5	4.0-7.0	3.5-5.5	---
	5-28	2.0-6.0	3.5-5.5	---
	28-60	---	---	---
Ebal	0-5	4.0-12.0	4.5-5.5	---
	5-9	7.0-15.0	4.5-5.5	---
	9-20	14.0-28.0	3.5-6.0	---
	20-67	21.0-38.0	4.5-7.3	---
	67-80	---	---	---
AcuF:				
Alford	0-5	5.0-18.0	4.5-7.3	---
	5-61	5.0-16.0	4.5-5.5	---
	61-80	4.0-12.0	4.5-6.5	---
AfzG:				
Alvin	0-5	4.0-11.0	4.5-7.3	---
	5-12	6.0-10.0	5.1-6.5	---
	12-38	9.0-14.0	5.1-6.5	---
	38-80	2.0-5.0	5.1-6.5	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
AfzG:				
Tobinsport	0-9	7.0-12.0	4.5-5.5	---
	9-27	7.0-15.0	4.5-7.3	---
	27-52	3.0-8.0	4.5-5.5	---
	52-80	2.0-6.0	4.5-5.5	---
AgrA:				
Apalona	0-9	4.0-14.0	4.5-7.3	---
	9-30	9.0-14.0	4.5-6.0	---
	30-54	6.0-15.0	4.5-5.5	---
	54-75	12.0-24.0	4.5-5.5	---
	75-90	7.0-15.0	5.1-6.5	---
	90-99	---	---	---
AgrB, AgrC2:				
Apalona	0-8	4.0-14.0	4.5-7.3	---
	8-25	9.0-14.0	4.5-6.0	---
	25-49	6.0-15.0	4.5-5.5	---
	49-69	12.0-24.0	4.5-5.5	---
	69-90	7.0-15.0	5.1-6.5	---
	90-99	---	---	---
AgrC3:				
Apalona	0-4	4.0-14.0	4.5-7.3	---
	4-20	9.0-14.0	4.5-6.0	---
	20-39	6.0-15.0	4.5-5.5	---
	39-71	12.0-24.0	4.5-5.5	---
	71-90	7.0-15.0	5.1-6.5	---
	90-99	---	---	---
BkeC2:				
Bloomfield	0-4	4.0-10.0	5.1-7.3	---
	4-17	1.0-7.0	5.1-7.3	---
	17-80	3.0-8.0	5.1-7.3	---
Alvin	0-11	4.0-11.0	4.5-7.3	---
	11-15	6.0-10.0	5.1-6.5	---
	15-60	9.0-14.0	5.1-6.5	---
	60-80	2.0-5.0	5.1-6.5	---
BodAH:				
Bonnie	0-10	4.0-13.0	4.5-7.3	---
	10-40	8.0-15.0	4.5-5.5	---
	40-60	8.0-19.0	4.5-6.5	---
BodAM:				
Bonnie	0-4	5.0-14.0	4.5-6.5	---
	4-22	8.0-16.0	4.5-5.5	---
	22-60	8.0-16.0	4.5-6.5	---
CndAH:				
Combs	0-16	8.0-14.0	5.6-7.8	---
	16-49	7.0-12.0	5.6-7.8	---
	49-80	7.0-14.0	5.6-7.8	---
CwaAH:				
Cuba	0-8	8.0-18.0	4.5-7.3	---
	8-30	5.0-15.0	4.5-5.5	---
	30-60	5.0-15.0	4.5-5.5	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
DduC2:				
Deuchars	0-10	5.0-15.0	4.5-7.3	---
	10-30	5.0-15.0	3.5-5.5	---
	30-55	15.0-35.0	3.5-6.0	---
	55-62	20.0-35.0	4.5-7.3	---
	62-80	---	---	---
EabD2:				
Ebal	0-7	4.0-12.0	4.5-7.3	---
	7-13	7.0-15.0	4.5-5.5	---
	13-21	14.0-28.0	3.5-6.0	---
	21-80	21.0-38.0	4.5-7.3	---
	80-90	---	---	---
Deuchars	0-10	5.0-15.0	4.5-7.3	---
	10-30	5.0-15.0	3.5-5.5	---
	30-55	15.0-35.0	3.5-6.0	---
	55-62	15.0-35.0	4.5-7.3	---
	62-80	---	---	---
Kitterman	0-4	18.0-30.0	3.5-6.0	---
	4-26	20.0-35.0	4.5-5.5	---
	26-35	25.0-40.0	5.1-7.3	---
	35-60	---	---	---
EabD3:				
Ebal	0-3	12.0-17.0	4.5-7.3	---
	3-9	7.0-15.0	4.5-5.5	---
	9-17	14.0-28.0	3.5-6.0	---
	17-67	21.0-38.0	4.5-7.3	---
	67-80	---	---	---
Deuchars	0-5	5.0-15.0	4.5-7.3	---
	5-24	5.0-15.0	3.5-5.5	---
	24-55	15.0-35.0	3.5-6.0	---
	55-62	20.0-35.0	4.5-7.3	---
	62-80	---	---	---
Kitterman	0-2	18.0-30.0	3.5-6.0	---
	2-22	20.0-35.0	4.5-5.5	---
	22-27	25.0-40.0	5.1-7.3	---
	27-60	---	---	---
EemAQ:				
Elk	0-8	5.0-15.0	4.5-7.3	---
	8-49	8.0-18.0	4.5-6.5	---
	49-62	8.0-15.0	4.5-6.0	---
	62-80	5.0-15.0	4.5-6.0	---
EesA, EesAQ:				
Elkinsville	0-8	6.0-15.0	4.5-7.3	---
	8-38	9.0-18.0	4.5-7.3	---
	38-65	10.0-16.0	4.5-5.5	---
	65-80	8.0-15.0	4.5-6.0	---
Millstone	0-12	4.0-10.0	4.5-7.3	---
	12-65	4.0-10.0	4.5-6.0	---
	65-80	4.0-10.0	4.5-6.0	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
EesD2, EesDQ:				
Elkinsville	0-6	6.0-15.0	4.5-7.3	---
	6-28	9.0-18.0	4.5-7.3	---
	28-54	10.0-16.0	4.5-5.5	---
	54-80	8.0-15.0	4.5-6.0	---
Millstone	0-7	4.0-10.0	4.5-7.3	---
	7-56	4.0-10.0	4.5-6.0	---
	56-80	4.0-10.0	4.5-6.0	---
EesFQ:				
Elkinsville	0-5	6.0-15.0	4.5-7.3	---
	5-24	9.0-18.0	4.5-7.3	---
	24-50	10.0-16.0	4.5-5.5	---
	50-80	8.0-15.0	4.5-6.0	---
Millstone	0-6	4.0-10.0	4.5-7.3	---
	6-54	4.0-10.0	4.5-6.0	---
	54-80	4.0-10.0	4.5-6.0	---
GacAW:				
Gatchel	0-4	7.0-15.0	5.6-7.3	---
	4-18	6.0-12.0	5.6-7.3	---
	18-60	6.0-12.0	5.6-7.3	---
GhaA:				
Ginat	0-9	8.0-15.0	4.5-7.3	---
	9-32	8.0-15.0	4.5-6.0	---
	32-46	10.0-20.0	4.5-7.3	---
	46-80	10.0-25.0	5.1-7.8	---
HbhA:				
Hartz	0-9	7.0-15.0	4.5-7.3	---
	9-65	10.0-16.0	4.5-5.5	---
	65-75	10.0-22.0	4.5-7.3	---
	75-80	10.0-22.0	7.4-8.4	10-30
HcaA:				
Hatfield	0-7	5.0-15.0	4.5-7.3	---
	7-20	5.0-12.0	4.5-6.0	---
	20-36	8.0-15.0	4.5-5.5	---
	36-78	10.0-18.0	4.5-6.5	---
	78-83	10.0-20.0	5.6-7.8	---
HcbAQ:				
Hatfield	0-10	10.0-20.0	4.5-7.3	---
	10-32	8.0-15.0	4.5-5.5	---
	32-64	10.0-18.0	4.5-6.5	---
	64-80	10.0-20.0	5.6-7.8	---
HcgAH, HcgAQ:				
Haymond	0-10	4.0-15.0	5.6-7.3	---
	10-44	10.0-16.0	5.6-7.3	---
	44-60	3.0-16.0	6.1-7.8	---
HsaB2:				
Hosmer	0-8	6.0-11.0	4.5-7.3	---
	8-30	7.0-20.0	4.5-6.0	---
	30-63	7.0-15.0	4.5-6.0	---
	63-80	7.0-15.0	4.5-6.0	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
HubAH:				
Huntington	0-12	12.0-25.0	5.6-7.8	---
	12-70	10.0-22.0	5.6-7.8	---
	70-80	7.0-18.0	5.6-7.8	---
JoaA:				
Johnsburg	0-10	4.0-12.0	4.5-7.3	---
	10-36	5.0-15.0	3.5-5.5	---
	36-72	5.0-15.0	3.5-5.5	---
	72-90	4.0-12.0	3.5-5.5	---
	90-99	---	---	---
JoeG:				
Jubin	0-4	5.0-12.0	5.1-6.5	---
	4-24	2.0-6.0	4.5-6.0	---
	24-80	2.0-6.0	4.5-6.0	---
Branchville	0-3	10.0-18.0	5.1-6.5	---
	3-23	10.0-16.0	5.1-6.5	---
	23-29	10.0-20.0	5.1-6.5	---
	29-55	20.0-35.0	4.5-7.3	---
	55-80	20.0-35.0	6.1-7.8	---
Rock outcrop.				
LeaA:				
Lauer	0-8	6.0-18.0	4.5-7.3	---
	8-54	10.0-18.0	4.5-5.5	---
	54-63	8.0-18.0	6.1-7.8	0-5
	63-80	6.0-15.0	7.4-8.4	5-30
McgC2:				
Markland	0-6	14.0-22.0	5.1-7.3	---
	6-25	14.0-24.0	4.5-7.8	0-5
	25-42	14.0-18.0	7.4-8.4	5-25
	42-80	8.0-16.0	7.4-8.4	20-45
McnGQ:				
Markland	0-4	14.0-22.0	5.1-7.3	---
	4-28	14.0-24.0	4.5-7.8	0-5
	28-59	14.0-18.0	7.4-8.4	5-25
	59-80	8.0-16.0	7.4-8.4	20-45
McpC3:				
Markland	0-4	16.0-24.0	5.1-7.3	---
	4-20	14.0-24.0	4.5-7.8	0-5
	20-42	14.0-18.0	7.4-8.4	5-25
	42-80	8.0-16.0	7.4-8.4	20-45
McuDQ:				
Markland	0-4	16.0-24.0	5.1-7.3	---
	4-18	14.0-24.0	4.5-7.8	0-5
	18-40	14.0-18.0	7.4-8.4	5-25
	40-80	8.0-16.0	7.4-8.4	20-45
MhkAH:				
McAdoo	0-10	11.0-19.0	6.6-7.8	0-10
	10-48	10.0-19.0	6.6-7.8	0-10
	48-60	5.0-19.0	6.6-8.4	0-10

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
MhuA:				
McGary	0-11	5.0-14.0	5.6-7.3	---
	11-42	10.0-24.0	4.5-7.8	0-15
	42-50	16.0-24.0	6.6-8.4	5-30
	50-60	10.0-18.0	7.4-8.4	10-40
MsbB, MsbBQ:				
Millstone	0-10	4.0-10.0	4.5-7.3	---
	10-62	4.0-10.0	4.5-6.0	---
	62-80	4.0-10.0	4.5-6.0	---
Elkinsville	0-8	6.0-15.0	4.5-7.3	---
	8-34	9.0-18.0	4.5-7.3	---
	34-60	10.0-16.0	4.5-5.5	---
	60-80	8.0-15.0	4.5-6.0	---
MsbC2, MsbCQ:				
Millstone	0-8	4.0-10.0	4.5-7.3	---
	8-58	4.0-10.0	4.5-6.0	---
	58-80	4.0-10.0	4.5-6.0	---
Elkinsville	0-7	6.0-15.0	4.5-7.3	---
	7-30	9.0-18.0	4.5-7.3	---
	30-56	10.0-16.0	4.5-5.5	---
	56-80	8.0-15.0	4.5-6.0	---
NbgAH:				
Newark	0-11	15.0-30.0	5.6-7.8	---
	11-51	10.0-20.0	5.6-7.8	---
	51-60	8.0-20.0	5.6-7.8	---
PhwA:				
Percell	0-9	6.0-18.0	4.5-7.3	---
	9-56	8.0-15.0	4.5-7.3	---
	56-79	8.0-18.0	5.6-7.3	---
	79-90	10.0-20.0	7.4-8.4	2-30
PhwB2:				
Percell	0-8	6.0-18.0	4.5-7.3	---
	8-49	8.0-15.0	4.5-7.3	---
	49-70	8.0-18.0	5.6-7.3	---
	70-80	10.0-20.0	7.4-8.4	2-30
PhwB2:				
Percell	0-8	6.0-18.0	4.5-7.3	---
	8-49	8.0-15.0	4.5-7.3	---
	49-70	8.0-18.0	5.6-7.3	---
	70-80	10.0-20.0	7.4-8.4	2-30
PkaAH:				
Petrolia	0-8	11.0-20.0	5.6-7.3	---
	8-30	11.0-20.0	6.1-7.3	---
	30-80	10.0-20.0	6.1-7.8	---
PsmA:				
Princeton	0-8	5.0-15.0	5.1-7.3	---
	8-41	7.0-15.0	4.5-7.3	---
	41-60	2.0-5.0	4.5-6.0	---
	60-80	1.0-7.0	5.1-7.3	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
RatAH:				
Rahm	0-8	12.0-25.0	6.1-7.3	---
	8-24	10.0-20.0	6.1-7.8	---
	24-51	10.0-20.0	4.5-7.3	---
	51-80	10.0-20.0	4.5-6.5	---
RgvB:				
Rickert	0-9	5.0-12.0	4.5-7.3	---
	9-54	5.0-12.0	4.5-6.0	---
	54-80	5.0-10.0	4.5-6.5	---
Alford	0-9	5.0-18.0	4.5-7.3	---
	9-72	5.0-16.0	4.5-5.5	---
	72-80	4.0-12.0	4.5-6.5	---
RgvC2:				
Rickert	0-8	5.0-12.0	4.5-7.3	---
	8-49	5.0-12.0	4.5-6.0	---
	49-80	5.0-10.0	4.5-6.5	---
Alford	0-6	5.0-18.0	4.5-7.3	---
	6-72	5.0-16.0	4.5-5.5	---
	72-80	4.0-12.0	4.5-6.5	---
RgvC3:				
Rickert	0-6	5.0-12.0	4.5-7.3	---
	6-42	5.0-12.0	4.5-6.0	---
	42-80	5.0-10.0	4.5-6.5	---
Alford	0-4	5.0-18.0	4.5-7.3	---
	4-72	5.0-16.0	4.5-5.5	---
	72-80	4.0-12.0	4.5-6.5	---
RgvD3:				
Rickert	0-5	5.0-12.0	4.5-7.3	---
	5-42	5.0-12.0	4.5-6.0	---
	42-80	5.0-10.0	4.5-6.5	---
Alford	0-4	5.0-18.0	4.5-7.3	---
	4-72	5.0-16.0	4.5-5.5	---
	72-80	4.0-12.0	4.5-6.5	---
RtcB2:				
Ryker	0-6	4.0-17.0	4.5-7.3	---
	6-30	3.0-20.0	4.5-7.3	---
	30-80	5.0-16.0	4.5-5.5	---
RtcC2:				
Ryker	0-6	4.0-17.0	4.5-7.3	---
	6-25	3.0-20.0	4.5-7.3	---
	25-80	5.0-16.0	4.5-5.5	---
ScbA, ScbAQ, ScdB, ScdBQ:				
Sciotoville	0-9	4.0-15.0	5.1-7.3	---
	9-27	6.0-15.0	4.5-5.5	---
	27-50	5.0-15.0	4.5-5.5	---
	50-80	5.0-18.0	4.5-6.5	---
SfyB2:				
Shircliff	0-8	5.0-14.0	5.1-7.3	---
	8-19	10.0-20.0	4.5-6.0	---
	19-43	16.0-24.0	4.5-7.8	0-5
	43-80	10.0-18.0	7.9-8.4	10-45

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
StdAH:				
Stendal	0-8	5.0-15.0	4.5-7.3	---
	8-40	5.0-15.0	4.5-5.5	---
	40-60	5.0-15.0	4.5-5.5	---
TakC:				
Tapawingo	0-4	5.0-15.0	5.6-7.3	---
	4-16	8.0-18.0	5.1-7.3	---
	16-38	8.0-18.0	5.1-7.3	---
	38-80	10.0-24.0	5.6-7.3	---
TakD:				
Tapawingo	0-4	5.0-15.0	5.6-7.3	---
	4-14	8.0-18.0	5.1-7.3	---
	14-30	8.0-18.0	5.1-7.3	---
	30-80	10.0-24.0	5.6-7.3	---
TckA, TckB:				
Tobinsport	0-9	7.0-12.0	4.5-7.3	---
	9-27	7.0-15.0	4.5-7.3	---
	27-52	3.0-8.0	4.5-5.5	---
	52-80	2.0-6.0	4.5-5.5	---
Uaa.				
Udorthents				
UabBK:				
Udipsamments	0-5	10.0-25.0	5.6-7.3	---
	5-80	2.0-10.0	5.6-7.3	---
Uas:				
Udorthents.				
Pits, quarries.				
UddD:				
Urban land.				
Alford	0-6	5.0-18.0	4.5-7.3	---
	6-72	5.0-16.0	4.5-5.5	---
	72-80	4.0-12.0	4.5-6.5	---
UehB:				
Urban land.				
Elkinsville	0-8	6.0-15.0	4.5-7.3	---
	8-34	9.0-18.0	4.5-7.3	---
	34-60	10.0-16.0	4.5-5.5	---
	60-80	8.0-15.0	4.5-6.0	---
Hatfield	0-7	5.0-12.0	4.5-7.3	---
	7-20	5.0-12.0	4.5-6.0	---
	20-36	8.0-15.0	4.5-5.5	---
	36-78	10.0-18.0	4.5-6.5	---
	78-83	10.0-20.0	5.6-7.8	---
UffY.				
Urban land				

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	pH	Pct
W.				
Water				
WaaAH:				
Wakeland	0-7	4.0-12.0	5.6-7.3	---
	7-29	4.0-12.0	5.6-7.8	---
	29-60	4.0-12.0	5.6-7.8	---
WokAH:				
Wilbur	0-7	4.0-16.0	5.6-7.3	---
	7-32	4.0-15.0	5.6-7.8	---
	32-60	4.0-16.0	5.6-7.8	---
WprAH:				
Wirt	0-8	6.0-13.0	5.6-7.3	---
	8-38	4.0-12.0	5.6-7.3	---
	38-60	3.0-12.0	5.6-7.3	---
WrlAH:				
Woodmere	0-10	12.0-27.0	6.1-7.3	---
	10-30	10.0-20.0	6.1-7.3	---
	30-42	10.0-20.0	4.5-6.0	---
	42-80	10.0-20.0	4.5-6.0	---
ZcaA:				
Zipp	0-10	18.0-33.0	5.6-7.3	---
	10-45	17.0-35.0	5.6-7.3	---
	45-60	16.0-32.0	6.6-8.4	0-20

Table 20.--Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding			
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Maximum ponding depth
					Ft			Ft
AbvD2, AbvD3:								
Adyeville	B	---	---	---	---	---	---	---
Wellston	B	---	---	---	---	---	---	---
Deuchars	C	---	---	---	2.0-3.0	Perched	Dec-Apr	---
AccG:								
Adyeville	B	---	---	---	---	---	---	---
Tipsaw	B	---	---	---	---	---	---	---
Ebal	B	---	---	---	2.0-3.0	Perched	Dec-Apr	---
AcuF:								
Alford	C	---	---	---	---	---	---	---
AfzG:								
Alvin	B	---	---	---	---	---	---	---
Tobinsport	B	---	---	---	---	---	---	---
AgrA, AgrB, AgrC2:								
Apalona	C	---	---	---	2.0-3.0	Perched	Dec-Apr	---
AgrC3:								
Apalona	C	---	---	---	1.5-3.0	Perched	Dec-Apr	---
BkeC2:								
Bloomfield	A	---	---	---	---	---	---	---
Alvin	B	---	---	---	---	---	---	---
BodAH:								
Bonnie	C/D	Frequent	Brief	Jan-Jun	0.0-1.0	Apparent	Dec-May	0.5
BodAM:								
Bonnie	D	Frequent	Brief	Jan-Jun	0.0-0.5	Apparent	Nov-Aug	2.0
CndAH:								
Combs	B	Frequent	Brief	Jan-Jun	---	---	---	---
CwaAH:								
Cuba	B	Frequent	Brief	Jan-Jun	---	---	---	---
DduC2:								
Deuchars	C	---	---	---	2.0-3.0	Perched	Dec-Apr	---
EabD2, EabD3:								
Ebal	C	---	---	---	2.0-3.0	Perched	Dec-Apr	---
Deuchars	C	---	---	---	2.0-3.0	Perched	Dec-Apr	---
Kitterman	C	---	---	---	1.0-2.0	Perched	Dec-Apr	---
EemAQ:								
Elk	B	Rare	---	Jan-Jun	3.5-5.0	Apparent	Dec-Apr	---

Table 20.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding			
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Maximum ponding depth
					Ft			Ft
EesA:								
Elkinsville	B	---	---	---	---	---	---	---
Millstone	B	---	---	---	---	---	---	---
EesAQ:								
Elkinsville	B	Rare	---	Jan-Jun	---	---	---	---
Millstone	B	Rare	---	Jan-Jun	---	---	---	---
EesD2:								
Elkinsville	B	---	---	---	---	---	---	---
Millstone	B	---	---	---	---	---	---	---
EesDQ:								
Elkinsville	B	Rare	---	Jan-Jun	---	---	---	---
Millstone	B	Rare	---	Jan-Jun	---	---	---	---
EesFQ:								
Elkinsville	B	Rare	---	Jan-Jun	---	---	---	---
Millstone	B	Rare	---	Jan-Jun	---	---	---	---
GacAW:								
Gatchel	B	Occasional-	Very brief	Jan-Jun	---	---	---	---
GhaA:								
Ginat	C	---	---	---	0.0-1.0	Apparent	Dec-May	0.5
HbhA:								
Hartz	B	---	---	---	1.0-2.0	Perched	Dec-Apr	---
HcaA:								
Hatfield	C	---	---	---	0.5-2.0	Perched	Dec-Apr	---
HcbAQ:								
Hatfield	C	Rare	---	Jan-Jun	0.5-2.0	Perched	Dec-Apr	---
HcgAH:								
Haymond	B	Frequent---	Brief-----	Jan-Jun	---	---	---	---
HcgAQ:								
Haymond	B	Rare	---	Jan-Jun	---	---	---	---
HsaB2:								
Hosmer	C	---	---	---	1.5-2.5	Perched	Dec-Apr	---
HubAH:								
Huntington	B	Frequent---	Brief-----	Jan-Jun	---	---	---	---
JoaA:								
Johnsburg	C	---	---	---	0.5-2.0	Perched	Dec-Apr	---
JoeG:								
Jubin	B	---	---	---	---	---	---	---
Branchville	B	---	---	---	2.0-3.0	Perched	Dec-Apr	---
Rock outcrop.								

Table 20.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding			
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Maximum ponding depth
					Ft			Ft
LeaA:								
Lauer	C	---	---	---	0.5-2.0	Perched	Dec-Apr	---
McgC2, McpC3:								
Markland	C	---	---	---	---	---	---	---
McnGQ, McuDQ:								
Markland	C	Rare	---	Jan-Jun	---	---	---	---
MhkAH:								
McAdoo	B	Frequent	Brief	Jan-Jun	---	---	---	---
MhuA:								
McGary	C	---	---	---	0.5-2.0	Perched	Dec-Apr	---
MsbB, MsbC2:								
Millstone	B	---	---	---	---	---	---	---
Elkinsville	B	---	---	---	---	---	---	---
MsbBQ, MsbCQ:								
Millstone	B	Rare	---	Jan-Jun	---	---	---	---
Elkinsville	B	Rare	---	Jan-Jun	---	---	---	---
NbgAH:								
Newark	C	Frequent	Brief	Jan-Jun	0.5-2.0	Apparent	Dec-Apr	---
PhwA, PhwB2:								
Percell	B	---	---	---	2.0-3.5	Perched	Dec-Apr	---
PkaAH:								
Petrolia	C/D	Frequent	Brief	Jan-Jun	0.0-1.0	Apparent	Dec-May	1.0
PsmA:								
Princeton	B	---	---	---	---	---	---	---
RatAH:								
Rahm	C	Frequent	Brief	Jan-Jun	0.5-2.0	Apparent	Dec-Apr	---
RgvB, RgvC2, RgvC3, RgvD3:								
Rickert	B	---	---	---	3.5-5.0	Perched	Dec-Apr	---
Alford	B	---	---	---	---	---	---	---
RtcB2, RtcC2:								
Ryker	B	---	---	---	---	---	---	---
ScbA, ScdB:								
Sciotoville	C	---	---	---	1.0-2.0	Perched	Dec-Apr	---
ScbAQ, ScdBQ:								
Sciotoville	C	Rare	---	Jan-Jun	1.0-2.0	Perched	Dec-Apr	---
SfyB2:								
Shircliff	C	---	---	---	1.5-2.5	Perched	Dec-Apr	---
StdAH:								
Stendal	C	Frequent	Brief	Jan-Jun	0.5-2.0	Apparent	Dec-Apr	---
TakC, TakD:								
Tapawingo	C	---	---	---	---	---	---	---

Table 20.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding			
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Maximum ponding depth
					Ft			Ft
TckA, TckB:								
Tobinsport	B	---	---	---	---	---	---	---
Uaa.								
Udorthents								
UabBK:								
Udipsamments	A	Occasional-	Brief	Jan-Jun	---	---	---	---
Uas:								
Udorthents.								
Pits, quarries.								
UddD:								
Urban land.								
Alford	B	---	---	---	---	---	---	---
UehB:								
Urban land.								
Elkinsville	B	---	---	---	---	---	---	---
Hatfield	C	---	---	---	0.5-2.0	Perched	Dec-Apr	---
UffY:								
Urban land	---	Rare	---	Jan-Jun	---	---	---	---
W.								
Water								
WaaAH:								
Wakeland	C	Frequent---	Brief	Jan-Jun	0.5-2.0	Apparent	Dec-Apr	---
WokAH:								
Wilbur	B	Frequent---	Brief	Jan-Jun	1.5-2.5	Apparent	Dec-Apr	---
WprAH:								
Wirt	B	Frequent---	Brief	Jan-Jun	---	---	---	---
WrlAH:								
Woodmere	B	Frequent---	Brief	Jan-Jun	2.0-3.5	Apparent	Dec-Apr	---
ZcaA:								
Zipp	D	---	---	---	0.0-1.0	Apparent	Nov-May	0.5

Table 21.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Bedrock		Soil slippage potential	Potential for frost action	Risk of corrosion	
					Uncoated steel	Concrete
	In					
AbvD2, AbvD3:						
Adyeville	20-40	Soft	Medium	Moderate	Moderate	High.
Wellston	40-60	Soft	Medium	High	Moderate	High.
Deuchars	>60	Soft	Medium	High	High	High.
AccG:						
Adyeville	20-40	Soft	Medium	Moderate	Moderate	High.
Tipsaw	20-40	Soft	Medium	Moderate	Low	High.
Ebal	>50	Soft	High	Moderate	High	High.
AcuF:						
Alford	>80	---	Medium	High	Moderate	High.
AfzG:						
Alvin	>80	---	Medium	Moderate	Low	High.
Tobinsport	>80	---	Medium	High	Moderate	High.
AgrA, AgrB, AgrC2, AgrC3:						
Apalona	>72	Soft	Low	High	Moderate	High.
BkeC2:						
Bloomfield	>80	---	Low	Low	Low	High.
Alvin	>80	---	Low	Moderate	Low	High.
BodAH:						
Bonnie	>60	---	Low	High	High	High.
BodAM:						
Bonnie	>60	---	Low	High	High	High.
CndAH:						
Combs	>80	---	Low	Moderate	Low	Low.
CwaAH:						
Cuba	>60	---	Low	High	Low	High.
DduC2:						
Deuchars	>60	Soft	Medium	High	High	High.
EabD2, EabD3:						
Ebal	>50	Soft	High	Moderate	High	High.
Deuchars	>60	Soft	Medium	High	High	High.
Kitterman	20-40	Soft	High	Moderate	High	Moderate.
EemAQ:						
Elk	>80	---	Low	High	Moderate	Moderate.

Table 21.--Soil Features--Continued

Map symbol and soil name	Bedrock		Soil slippage potential	Potential for frost action	Risk of corrosion	
					Uncoated steel	Concrete
	In					
EesA, EesAQ, EesD2, EesDQ:						
Elkinsville	>80	---	Low	High	Moderate	High.
Millstone	>80	---	Low	Moderate	Moderate	High.
EesFQ:						
Elkinsville	>80	---	Medium	High	Moderate	High.
Millstone	>80	---	Medium	Moderate	Moderate	High.
GacAW:						
Gatchel	>60	---	Low	Moderate	Low	Moderate.
GhaA:						
Ginat	>80	---	Low	High	High	High.
HbhA:						
Hartz	>80	---	Low	High	High	Moderate.
HcaA, HcbAQ:						
Hatfield	>80	---	Low	High	High	High.
HcgAH, HcgAQ:						
Haymond	>60	---	Low	High	Low	Low.
HsaB2:						
Hosmer	>80	---	Low	High	Moderate	High.
HubAH:						
Huntington	>80	---	Low	High	Low	Low.
JoaA:						
Johnsburg	>60	Soft	Low	High	High	High.
JoeG:						
Jubin	>80	---	Medium	Moderate	Low	High.
Branchville	>80	---	High	Moderate	High	Moderate.
Rock outcrop.						
LeaA:						
Lauer	>80	---	Low	High	High	Moderate.
McgC2, McnGQ, McpC3, McuDQ:						
Markland	>80	---	Medium	Moderate	High	Moderate.
MhkAH:						
McAdoo	>80	---	Low	High	Low	Low.
MhuA:						
McGary	>80	---	Low	High	High	Low.
MsbB, MsbBQ, MsbC2, MsbCQ:						
Millstone	>80	---	Low	Moderate	Moderate	High.
Elkinsville	>80	---	Low	High	Moderate	High.
NbgAH:						
Newark	>80	---	Low	High	High	Low.

Table 21.--Soil Features--Continued

Map symbol and soil name	Bedrock		Soil slippage potential	Potential for frost action	Risk of corrosion	
					Uncoated steel	Concrete
	In					
PhwA, PhwB2:						
Percell	>80	---	Low	High	High	Moderate.
PkaAH:						
Petrolia	>80	---	Low	High	High	Low.
PsmA:						
Princeton	>80	---	Low	Moderate	Moderate	Moderate.
RatAH:						
Rahm	>80	---	Low	High	High	High.
RgvB, RgvC2, RgvC3, RgvD3:						
Rickert	>80	---	Low	High	Moderate	High.
Alford	>80	---	Low	High	Moderate	High.
RtcB2, RtcC2:						
Ryker	>60	---	Low	High	Moderate	Moderate.
ScbA, ScbAQ, ScdB, ScdBQ:						
Sciotoville	>80	---	Low	High	Moderate	High.
SfyB2:						
Shircliff	>80	---	Low	High	High	Moderate.
StdAH:						
Stendal	>60	---	Low	High	High	High.
TakC:						
Tapawingo	>80	---	Low	High	Moderate	Moderate.
TakD:						
Tapawingo	>80	---	Medium	High	Moderate	Moderate.
TckA, TckB:						
Tobinsport	>80	---	Low	High	Moderate	High.
Uaa.						
Udorthents						
UabBK:						
Udipsamments	>80	---	Low	Low	Low	Low.
Uas:						
Udorthents.						
Pits, quarries.						
UddD:						
Urban land.						
Alford	>80	---	Low	High	Moderate	High.
UehB:						
Urban land.						
Elkinsville	>80	---	Low	High	Moderate	High.
Hatfield	>80	---	Low	High	High	High.

Table 21.--Soil Features--Continued

Map symbol and soil name	Bedrock		Soil slippage potential	Potential for frost action	Risk of corrosion	
					Uncoated steel	Concrete
	In					
UffY.						
Urban land						
W.						
Water						
WaaAH:						
Wakeland	>60	---	Low	High	Moderate	Low.
WokAH:						
Wilbur	>60	---	Low	High	Moderate	Low.
WprAH:						
Wirt	>60	---	Low	Moderate	Low	Moderate.
WrlAH:						
Woodmere	>80	---	Low	High	High	High.
ZcaA:						
Zipp	>60	---	Low	Moderate	High	Low.

Table 22.--Classification of the Soils

(An asterisk in the first column indicates that some or all map units of this soil are a taxadjunct to the series. See text for description of those characteristics that are outside the range of the series.)

Soil name	Family or higher taxonomic class
Adyeville	Coarse-loamy, mixed, semiactive, mesic Typic Hapludults
Alford	Fine-silty, mixed, superactive, mesic Ultic Hapludalfs
*Alvin	Coarse-loamy, mixed, active, mesic Typic Hapludalfs
Apalona	Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs
Bloomfield	Sandy, mixed, mesic Lamellic Hapludalfs
Bonnie	Fine-silty, mixed, active, acid, mesic Typic Fluvaquents
Branchville	Fine, mixed, active, mesic Aquic Hapludalfs
Combs	Coarse-loamy, mixed, active, mesic Fluventic Hapludolls
Cuba	Fine-silty, mixed, active, mesic Fluventic Dystrudepts
Deuchars	Fine-silty, mixed, active, mesic Oxyaquic Hapludalfs
Ebal	Fine, mixed, active, mesic Oxyaquic Hapludalfs
Elk	Fine-silty, mixed, active, mesic Ultic Hapludalfs
Elkinsville	Fine-silty, mixed, active, mesic Ultic Hapludalfs
Gatchel	Loamy-skeletal, mixed, superactive, mesic Dystric Fluventic Eutrudepts
Ginat	Fine-silty, mixed, active, mesic Typic Endoaqualfs
Hartz	Fine-silty, mixed, active, mesic Aquic Hapludalfs
Hatfield	Fine-silty, mixed, active, mesic Aeric Fragic Epiaqualfs
Haymond	Coarse-silty, mixed, superactive, mesic Dystric Fluventic Eutrudepts
Hosmer	Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs
Huntington	Fine-silty, mixed, active, mesic Fluventic Hapludolls
*Johnsburg	Fine-silty, mixed, active, mesic Fragiaquic Hapludults
Jubin	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Kitterman	Very fine, mixed, active, mesic Aquic Hapludalfs
Lauer	Fine-silty, mixed, active, mesic Aeric Epiaqualfs
Markland	Fine, mixed, active, mesic Typic Hapludalfs
*McAdoo	Fine-silty, mixed, active, mesic Fluventic Eutrudepts
McGary	Fine, mixed, active, mesic Aeric Epiaqualfs
Millstone	Fine-loamy, mixed, active, mesic Typic Hapludults
Newark	Fine-silty, mixed, active, nonacid, mesic Fluventic Endoaquepts
Percell	Fine-silty, mixed, active, mesic Oxyaquic Hapludalfs
Petrolia	Fine-silty, mixed, superactive, nonacid, mesic Fluventic Endoaquepts
Princeton	Fine-loamy, mixed, active, mesic Typic Hapludalfs
Rahm	Fine-silty, mixed, active, nonacid, mesic Fluventic Endoaquepts
Rickert	Fine-silty, mixed, active, mesic Ultic Hapludalfs
Ryker	Fine-silty, mixed, active, mesic Typic Paleudalfs
*Sciotoville	Fine-silty, mixed, active, mesic Fragiaquic Hapludalfs
Shircliff	Fine, mixed, active, mesic Oxyaquic Hapludalfs
Stendal	Fine-silty, mixed, active, acid, mesic Fluventic Endoaquepts
Tapawingo	Fine-loamy, mixed, active, nonacid, mesic Typic Udorthents
Tipsaw	Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts
Tobinsport	Fine-silty, mixed, active, mesic Ultic Hapludalfs
Udipsamments	Mixed, mesic Typic Udipsamments
Udorthents	Clayey, mixed, active, nonacid, mesic Typic Udorthents
Udorthents	Mixed Udorthents
Wakeland	Coarse-silty, mixed, superactive, nonacid, mesic Aeric Fluvaquents
Wellston	Fine-silty, mixed, active, mesic Ultic Hapludalfs
Wilbur	Coarse-silty, mixed, superactive, mesic Fluvaquentic Eutrudepts
Wirt	Coarse-loamy, mixed, superactive, mesic Dystric Fluventic Eutrudepts
Woodmere	Fine, mixed, active, mesic Oxyaquic Eutrudepts
Zipp	Fine, mixed, active, nonacid, mesic Typic Endoaquepts

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