United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with National Park Service, University of Kentucky, University of Tennessee Agricultural Experiment Station, and Kentucky Natural Resources and Environmental Protection Cabinet

Soil Survey of the Big South Fork National River and Recreation Area, Kentucky and Tennessee

How To Use This Soil Survey

General Soil Map

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

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

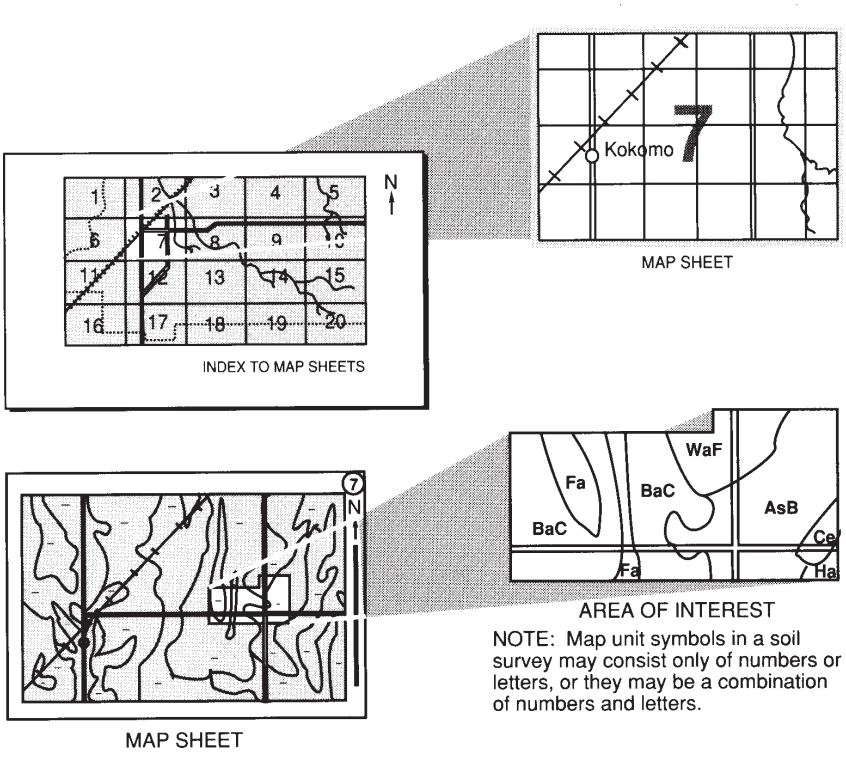
Detailed Soil Maps

The detailed soil maps 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 go to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go 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.



National Cooperative Soil Survey

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and the National Park Service, 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 2008. Soil names and descriptions were approved in 2008. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2008. This survey was made cooperatively by the Natural Resources Conservation Service, the National Park Service, the University of Kentucky, the University of Tennessee Agricultural Experiment Station, and the Kentucky Natural Resources and Environmental Protection Cabinet.

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.

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Citation For This Survey

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Cover Caption

View from Blue Heron overlooking the Big South Fork of the Cumberland River.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

Contents

Issued 2010

Foreword

This soil survey was developed in conjunction with the National Park Service Inventory and Monitoring Program and is intended to serve as the official source document for soils occurring within the Big South Fork National River and Recreation Area.

This soil survey contains information that affects current and future land use planning in the park. It contains predictions of soil behavior for selected land uses. The survey highlights soil limitations, actions needed to overcome the limitations, and the impact of selected land uses on the environment.

The soil survey is designed to meet the needs of the National Park Service and their partners for a better understanding of the various soil properties present in the park and their affect on various natural ecological properties in order to better 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. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the park 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 Big South National River and Recreation Area.

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State Conservationists in Tennessee and Kentucky
Natural Resources Conservation Service

Soil Survey of
Big South Fork National River and Recreation Area, Kentucky and Tennessee

By Harry S. Evans and Jennifer Y. Mason, Natural Resources Conservation Service

Fieldwork by Harry S. Evans, Jennifer Y. Mason, Dillon P. Gray, David A. Moore, Eddie C. Tudor, and Laura D. Weingartner, Natural Resources Conservation Service, and Jerry Richardson, Kentucky Natural Resources and Environmental Protection Cabinet

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
National Park Service, University of Kentucky, University of Tennessee Agricultural Experiment Station, and Kentucky Natural Resources and Environmental Protection Cabinet

The Big South Fork National River and Recreation Area (NRRA) encompasses approximately 50,585 hectares, or 505 square kilometers. The Big South Fork NRRA was formed from parts of four counties in Tennessee (Scott, Morgan, Fentress, and Pickett) and one county in Kentucky (McCreary). The Big South Fork NRRA is located approximately 80 kilometers west of Knoxville, Tennessee, 257 kilometers east of Nashville, Tennessee, and 201 kilometers south of Lexington, Kentucky (fig. 1). It lies entirely on the Cumberland Plateau portion of the Cumberland Plateau and Mountains Major Land Resource Area (MLRA 125).

Forest covers approximately 85 percent of the survey area. The majority of cleared land is now used for recreational activities within the park, visitors' centers and park headquarter facilities, and historical preservation areas, such as the Blevins Farm (fig. 2). Many of the soils formed in woodland and are typically light in color, strongly acid, and highly leached. They range in depth from shallow to very deep, have loamy subsoils, and contain few to many rock fragments.

General Nature of the Survey Area

This section gives general information about the Big South Fork National River and Recreation Area. It discusses history and settlement; physiography, relief, and drainage; and climate.

History and Settlement

Taken from the "Big South Fork; Geology and History of the Cumberland Plateau" by the United States Department of the Interior, National Park Service.

About 20,000 years ago the great ice sheets began retreating northward, opening the way for nomadic hunters to enter North America. By 10,000 BC these early Americans had reached the Southeast searching for large game animals such as elk,

Figure 1.—Location of the Big South Fork National River and Recreation Area in Kentucky and Tennessee.

bison, deer, and bear. The numerous rockshelters found in the Big South Fork made convenient homes for the early peoples.

About 900 to 100 AD a major shift in agriculture led the Indians to leave the plateau for the more fertile river bottoms of larger streams such as the Tennessee and Cumberland Rivers. There they lived in towns and villages, developing complex societies highly dependent on agriculture. Only occasionally did hunting parties venture into the remote areas of the Cumberland Plateau. By the time the first longhunters began to explore the area in the late 1700's, there was only very sparse Indian settlement in the region.

By the first decade of the 19th century, pioneer settlers came to the Upper Cumberland Plateau and the area of the Big South Fork of the Cumberland River. These first pioneers established farms and began developing the resources of the area including Salt Town, the 1817-1840 sites of the Beatty Saltworks, and the numerous saltpeter mines (dating from 1813 to 1860) found throughout the area. After these "cottage industries" waxed and waned following the Civil War, the coal, timber, and oil and gas resources were developed. The terror caused by the Civil War did little but isolate the region. Industry was limited to simple water-powered grist mills, moonshining, and the mining of "nitre" (potassium nitrate) for gunpowder. You can see evidence of nitre mining in one of the rockshelters on the Twin Arches Loop Trail.

During the height of the coal extraction from the area, one mine located at Blue Heron operated from 1937 to December of 1962, when the operations became no longer profitable. Logging also was a successful business in the area until the end of World War II when the area's coal and timber resources declined. The post World War II era saw a great exodus as young men returning from the war were no longer satisfied with the isolated life on the Cumberland Plateau. Many left, lured by the promise of jobs and better pay in the industries of the North. By the early 1950's, logging camps, railroads, and mines began to be abandoned and once-thriving towns such as Zenith, Barthell, and Blue Heron became ghost towns.

There are still many reminders of the past activity that has influenced the Big South Fork. Since the establishment of the Big South Fork National River and Recreation Area in 1974, the area is being preserved and opened for recreational use.

Figure 2.—An area of Lily loam, 5 to 12 percent slopes, located at the Blevins Farm, one of several old homesteads located throughout the park.

Physiography, Relief, and Drainage

The soil survey area of the Big South Fork NRRA lies entirely within the Cumberland Plateau portion of Major Land Resource Area 125 (Cumberland Plateau and Mountains). The Cumberland Plateau is a flat tableland consisting of highly dissected rocks of Pennsylvanian age. The dominant drainage pattern is dendritic, resulting in narrow valley flood plains. The resistant sandstone has weathered in many places, resulting in unusual erosion remnants such as rock houses, chimneys, and arches or natural bridges that are scattered throughout the survey area. Soils on the uplands range from shallow to very deep to sandstone, siltstone, and shale bedrock, have loamy subsoils, and have acid pH values. Soils on the footslopes and headslopes of drains are deep to very deep to bedrock and contain few to many rock fragments. Soils of the flood plains and in the drainageways are also deep to very deep, contain few to many rock fragments, and have pH values ranging from strongly acid to slightly acid. The Clear Fork and the New River converge to form the Big South Fork of the Cumberland River. The Big South Fork watershed drains an area of 3,579 square kilometers.

Climate

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

In winter, the average temperature is 1 degree C and the average daily minimum temperature is -6 degrees C. The lowest temperature on record, which occurred on

January 21, 1985, is -32 degrees C. In summer, the average temperature is 22 degrees C and the average daily maximum temperature is 29 degrees C. The highest recorded temperature, which occurred on July 17, 1980, is 38 degrees C.

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 (4 degrees C). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 1,389 millimeters. Of this, 711 millimeters, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 51 millimeters. The heaviest 1-day rainfall during the period of record was 127 millimeters, recorded on September 3, 1982. Thunderstorms occur on about 47 days each year, and most occur between May and August.

The average seasonal snowfall is 282 millimeters. The greatest snow depth at any one time during the period of record was 229 millimeters, recorded on February 16, 1969. On average, 3 days per year have at least 25 millimeters of snow on the ground. The heaviest 1-day snowfall on record was 254 millimeters, recorded on January 30, 1966.

The average relative humidity in midafternoon is about 59 percent. Humidity is higher at night, and the average at dawn is about 86 percent. The sun shines 64 percent of the time possible in summer and 42 percent in winter. The prevailing wind is from the northeast. Average windspeed is highest, between 12 and 14 kilometers per hour, from January to April.

How This Survey Was Made

This survey was made in conjunction with the National Park Service’s Soil Inventory and Monitoring Program to provide information about the soils and miscellaneous areas in the Big South Fork National River and Recreation Area. A scoping meeting was held in 2004 with park staff to identify their soil resource information needs and to relate those needs in the making of the soil survey. Of particular importance to park staff was information regarding the relationship of soil properties and site conditions to pedestrian and equestrian trail management issues as well as information on anthropologic soils associated with coal mine spoils and other mining activities within the park. Following the meeting, additional interviews were conducted to identify additional particular geographic areas of concern.

The Big South Fork National River and Recreation Area survey was initiated in 2005. Fieldwork for the project commenced in 2006. Fieldwork continued through the summer of 2009 and concentrated on looking at areas of concern pointed out by the Big South Fork National River and Recreation Area staff.

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

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous

areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

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

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

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

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

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.

General Soil Map Units

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

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

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

1. Soils on Ridgetops and Side Slopes Dominated by Residuum Derived from Interbedded Sandstone, Shale, and Siltstone (Lily-Gilpin-Sequoia)

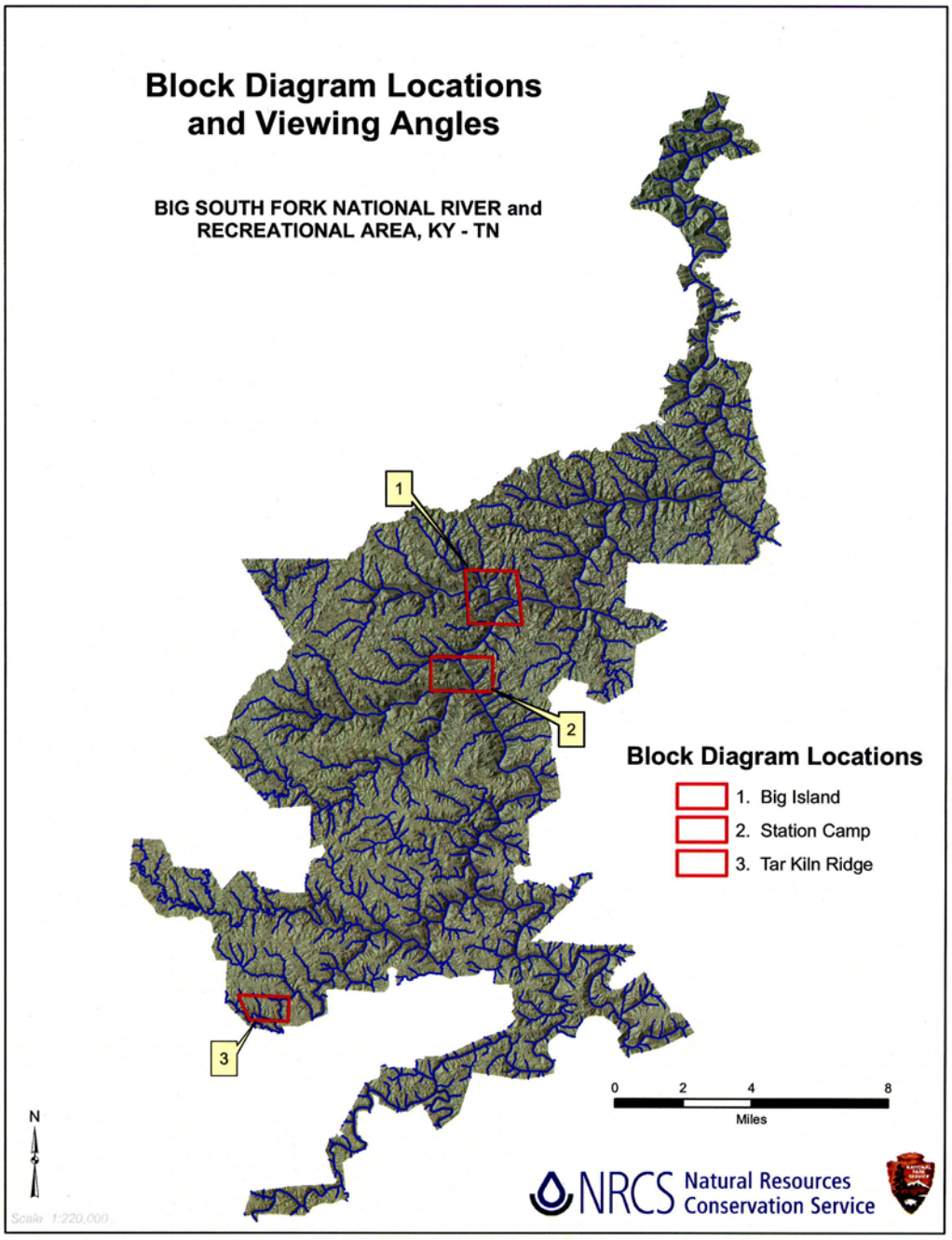
Percentage of park: 25 percent (figs. 3 and 4)
Depth class: Moderately deep and very deep to shale or sandstone bedrock
Position on landscape: Broad undulating to highly dissected ridgetops
Parent material: Residuum from sandstone, shale, and siltstone
Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 163 to 214 days
Dominant overstory: Mixed Oak/Heath Forest (Piedmont/Central Appalachian Low Elevation Type), Red Cedar Successional Forest, and Appalachian Shortleaf Pine

Minor Components

- Lonewood soils, which are fine-loamy and more than 152 centimeters to acid interbedded sandstone and shale; on broad, undulating ridgetops
- Wernock soils, which are fine-silty and 51 to 102 centimeters to acid interbedded shale and fine grained sandstone; on broad, undulating ridgetops
- Petros soils, which are loamy-skeletal and less than 51 centimeters to shale bedrock; on steep side slopes

Characteristics of Major Components

Lily soils
Depth class: Moderately deep to sandstone bedrock
Drainage class: Well drained
Permeability: Moderately rapid
Surface layer texture: Fine sandy loam or loam
Subsoil texture: Fine sandy loam or loam


Block Diagram Locations
and Viewing Angles
BIG SOUTH FORK NATIONAL RIVER and
RECREATIONAL AREA, KY - TN
1
2
3
Block Diagram Locations
1. Big Island
2. Station Camp
3. Tar Kiln Ridge
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Scale 1:220,000
NRCS Natural Resources
Conservation Service

General Soil Map Units

1. Soils on Ridgetops and Side Slopes Dominated by Residuum Derived from Interbedded Sandstone, Shale, and Siltstone
Lily-Gilpin-Sequoia

2.Soils on Ridgetops and Side Slopes Dominated by Residuum Derived from Sandstone
Lily-Ramsey

3.Soils in Gorges and on Escarpments Dominated by Residuum and Colluvium Derived from Interbedded Sandstone, Shale, and Siltstone
Gilpin-Bouldin-Rock outcrop

4.Soils on Flood Plains Dominated by Alluvium Derived from Interbedded Sandstone, Shale, and Siltstone
Pope-Skidmore-Atkins

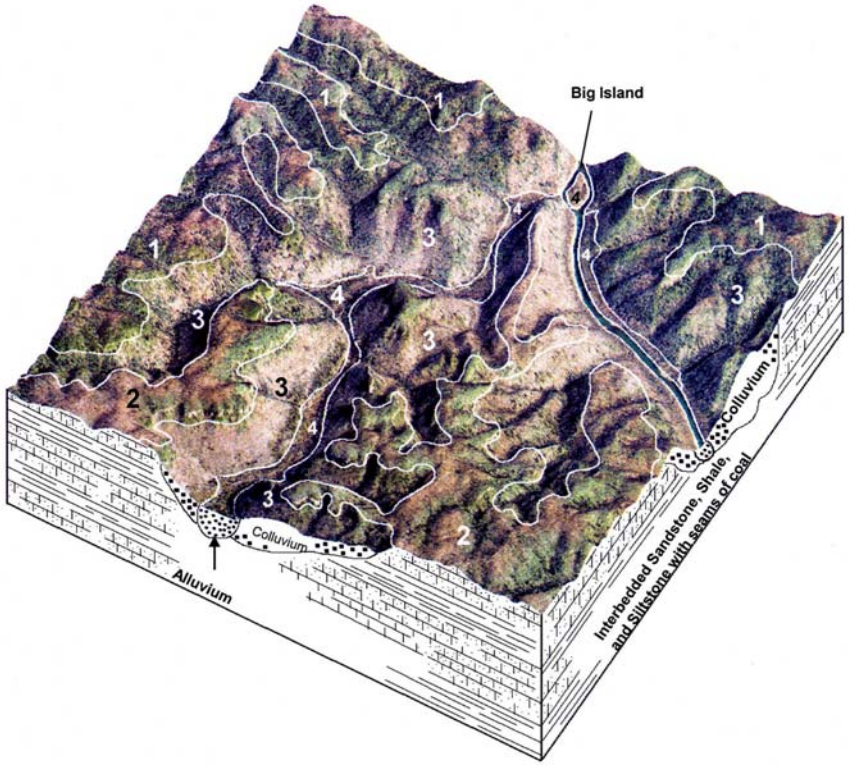

Figure 3.—Block Diagram 1. Generalized pattern of soil distribution and the conceptualized geology of the Big South Fork of the Cumberland River at Big Island.

General Soil Map Units

1. Soils on Ridgetops and Side Slopes Dominated by Residuum Derived from Interbedded Sandstone, Shale, and Siltstone
Lily-Gilpin-Sequoia

3.Soils in Gorges and on Escarpments Dominated by Residuum and Colluvium Derived from Interbedded Sandstone, Shale, and Siltstone
Gilpin-Bouldin-Rock outcrop

5. Water

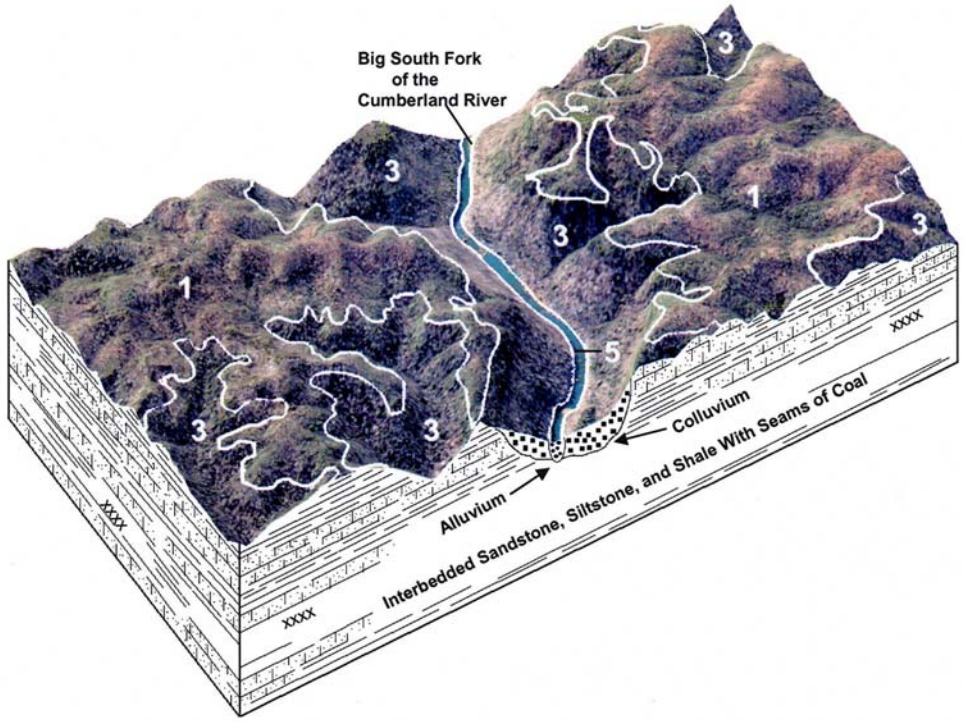

Figure 4.—Block Diagram 2. Generalized pattern of soil distribution and the conceptualized geology of the Big South Fork of the Cumberland River at Station Camp.

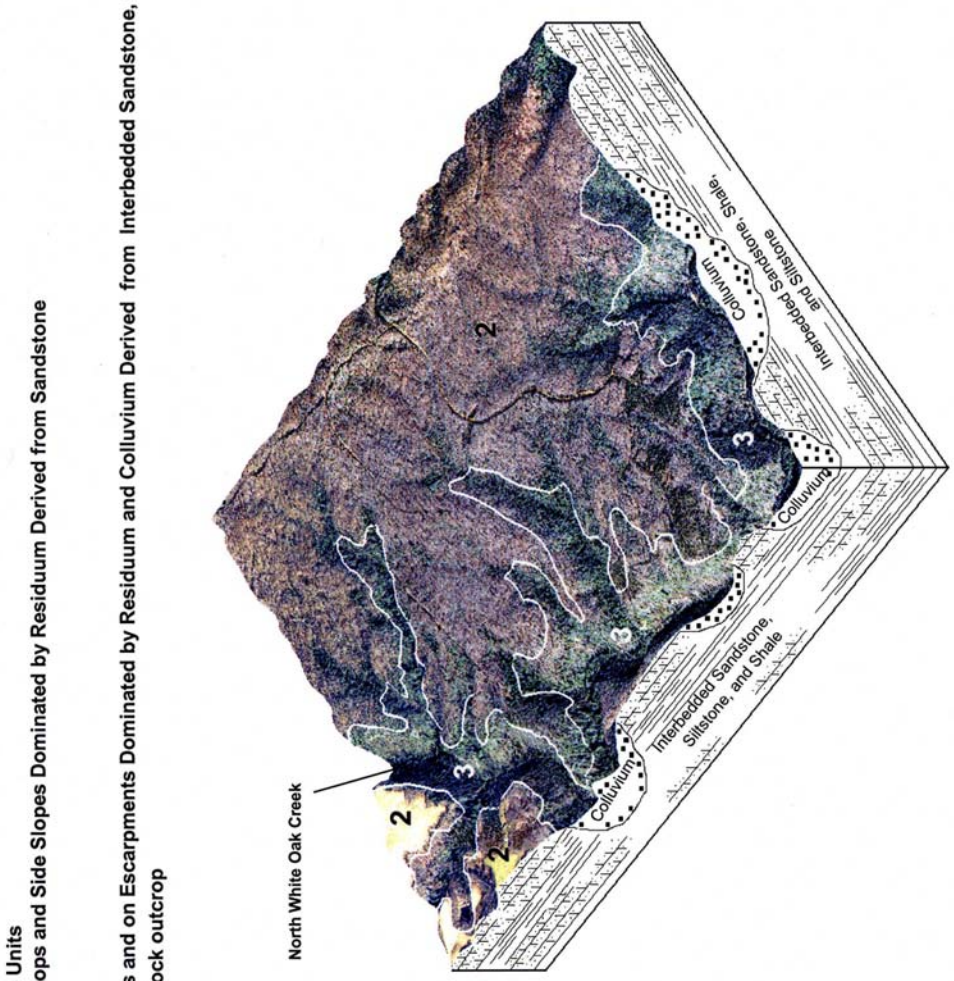

Figure 5.—Block Diagram 3. Generalized pattern of soil distribution and the conceptualized geology of the Big South Fork of the Cumberland River on Tar Kiln Ridge.

Substratum texture: Sandy clay loam or clay loam
Slope range: 2 to 35 percent

Gilpin soils
Depth class: Moderately deep to sandstone, shale, or siltstone bedrock
Drainage class: Well drained
Permeability: Moderate
Surface layer texture: Loam or silt loam
Subsoil texture: Loam, silty clay loam, or their channery analogues
Substratum texture: Clay loam, silty clay loam, or their channery analogues
Slope range: 2 to 70 percent

Sequoia soils
Depth class: Moderately deep to shale or siltstone bedrock
Drainage class: Well drained
Permeability: Moderately slow
Surface layer texture: Silt loam
Subsoil texture: Silty clay loam or its channery analogues
Substratum texture: Clay
Slope range: 2 to 20 percent

2. Soils on Ridgetops and Side Slopes Dominated by Residuum Derived from Sandstone (Lily-Ramsey)

Percentage of park: 32 percent (figs. 3 and 5)
Depth class: Shallow, moderately deep, and very deep to sandstone bedrock
Position on landscape: Broad undulating to highly dissected ridgetops
Parent material: Residuum from sandstone bedrock
Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 163 to 214 days
Dominant overstory: Mixed Oak/Heath Forest (Piedmont/Central Appalachian Low Elevation Type), Appalachian Shortleaf Pine-Mesic Oak Forest, and Southern Blue Ridge Escarpment Shortleaf Pine-Oak Forest

Minor Components

- Atkins soils, which are fine-loamy, poorly drained, and more than 152 centimeters to bedrock; primarily on Darrow and Tar Kiln Ridges in the western portion of the park at an elevation of 396 to 500 meters

Characteristics of Major Soils

Lily soils
Depth class: Moderately deep to sandstone bedrock
Drainage class: Well drained
Permeability: Moderately rapid
Surface layer texture: Fine sandy loam or loam
Subsoil texture: Fine sandy loam or loam
Substratum texture: Sandy clay loam or clay loam
Slope range: 2 to 35 percent

Ramsey soils
Depth class: Shallow to sandstone bedrock
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid or rapid

Surface layer texture: Loam or fine sandy loam
Subsoil texture: Loam, fine sandy loam, or sandy loam
Substratum texture: Fine sandy loam to channery fine sandy loam
Slope range: 5 to 70 percent

3. Soils in Gorges and on Escarpments Dominated by Residuum and Colluvium Derived from Interbedded Sandstone, Shale, and Siltstone (Gilpin-Bouldin-Rock outcrop)

Percentage of park: 35 percent (figs. 3, 4, and 5)
Depth class: Moderately deep to very deep to sandstone, shale, or siltstone bedrock
Position on landscape: Side slopes and footslopes of gorges and escarpments
Parent material: Residuum and colluvium derived from interbedded sandstone, shale, and siltstone
Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 163 to 214 days
Dominant overstory: Ridge and Valley Dry Mesic White Oak Hickory Forest, Rich Appalachian Red Oak/Sugar Maple Forest, Cumberland/Appalachian Hemlock–Hardwood Cove Forest, Central Interior Beech–White Oak Forest, and Piedmont Rich Cove/Mesic Slope Forest (Twinleaf Canada Type)

Minor Components

- Ramsey soils, which are shallow to sandstone bedrock and coarse-loamy; on the shoulders of the rock outcrop escarpments at the upper elevations in the gorges
- Shelocta soils, which are more than 152 centimeters to bedrock, are fine-loamy, and consist of colluvium derived from interbedded sandstone, siltstone, and shale; in the northernmost section of the park, predominantly overlying the Paragon Formation
- Petros soils, which are derived from loamy-skeletal residuum of acid shale and siltstone and are less than 51 centimeters to shale or siltstone bedrock; on steep side slopes in the southernmost portion of the park, south of the confluence of the Clear Fork River and the New River

Characteristics of Major Components

Gilpin soils
Depth class: Moderately deep to sandstone, shale, or siltstone bedrock
Drainage class: Well drained
Permeability: Moderate
Surface layer texture: Loam or silt loam
Subsoil texture: Loam, silty clay loam, or their channery analogues
Substratum texture: Clay loam, silty clay loam, or their channery analogues
Slope range: 20 to 70 percent

Bouldin soils
Depth class: Very deep to shale or sandstone bedrock
Drainage class: Well drained
Permeability: Very slow to moderately rapid
Surface layer texture: Fine sandy loam or loam or their gravelly, channery, flaggy, stony, or bouldery analogues
Subsoil texture: Sandy loam or loam or their gravelly, channery, flaggy, stony, or bouldery analogues

Substratum texture: Loam or clay loam or their gravelly, channery, flaggy, stony, or bouldery analogues
Slope range: 20 to 75 percent

Rock outcrop

This part of the map unit consists of Pennsylvanian-age conglomerate sandstone. Throughout the gorges the sandstone caprock forms a resistant rim that is not always continuous. The Rock outcrop is highly resistant to weathering processes but once the sandstone caprock is weathered and breaks away the rock forms colluvial soils on head slopes and footslopes of the gorge.

4. Soils on Flood Plains Dominated by Alluvium Derived from Interbedded Sandstone, Shale, and Siltstone (Pope-Skidmore-Atkins)

Percentage of park: 3 percent (fig. 3)
Depth class: Deep or very deep to bedrock
Position on landscape: Flood plains
Parent material: Alluvium
Elevation: 213 to 305 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 163 to 214 days
Dominant overstory: Montane Alluvial Forest (Small River Type), Sycamore, River Birch Levee Forest, and Sycamore-Sweetgum Swamp Forest

Minor Components

- None

Characteristics of Major Soils

Pope soils
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Surface layer texture: Fine sandy loam or loamy sand
Subsoil texture: Loam, sand, sandy loam, or loamy sand
Slope range: 0 to 4 percent

Skidmore soils
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Surface layer texture: Cobbly fine sandy loam
Subsoil texture: Very cobbly sandy loam
Substratum texture: Extremely cobbly loamy sand
Slope range: 0 to 4 percent

Atkins soils
Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow to moderate
Surface layer texture: Silt loam or loam
Subsoil texture: Loam
Substratum texture: Fine sandy loam or loam
Slope range: 0 to 4 percent

5. Water

Percentage of park: 5 percent (fig. 4)
Location: The New River, the Clear Fork River, and the Big South Fork of the Cumberland River

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 taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called non-contrasting, or similar, components. They 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 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 and agronomic interpretations. If intensive use of a small area is planned, an onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, 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, Shelocta-Bouldin complex, 30 to 75 percent slopes, extremely stony, very rocky.

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. For example, Lily-Ramsey complex, 5 to 12 percent slopes.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The Rock outcrop part of Rock outcrop-Ramsey complex, 20 to 70 percent slopes, is an example of a miscellaneous area.

Table 4 gives the hectares and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Ak—Atkins loam, ponded

Elevation: 213 to 305 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Atkins, ponded and similar soils: 85 percent
Contrasting soils: Philo soils—5 percent; Pope soils—5 percent; Skidmore soils—5 percent

Description of Atkins

Setting
Landform: Flood plain on dissected plateau
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Fine-loamy alluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Poorly drained
Organic matter content in the surface layer: 2.0 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: High—about 23.6 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Negligible
Depth to the top of the seasonal high water table: 0.0 to 30.0 centimeters
Water table kind: Apparent
Flooding: None
Ponding: Frequent for periods of very long duration; 15.0 to 60.0 centimeters
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 15 centimeters; loam
15 to 117 centimeters; loam
117 to 157 centimeters; fine sandy loam

Interpretive Groups
Land capability classification: 5w
Prime farmland: Not prime farmland
Hydric soil: Yes
Hydric criteria: 2B3, 3

Use and Management Concerns

- This soil is unsuited to cropland.
- The seasonal high water table can affect equipment use, grazing patterns, and the viability of grass and legume species.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- Soil wetness may limit the use of horses and off-road vehicles.
- The low strength interferes with the construction of trails, especially multi-use trails. Refer to the section “Use and Management of the Soils” for more information.

AyD—Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded

Elevation: 396 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Atkins, occasionally flooded and similar soils: 66 percent
Lily, occasionally flooded and similar soils: 30 percent
Contrasting soils: Pope soils—2 percent; Ramsey soils—2 percent

Description of Atkins

Setting
Landform: Flood plain on dissected plateau (fig. 6)
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Fine-loamy alluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Poorly drained
Organic matter content in the surface layer: 2.0 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: High—about 23.6 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Negligible
Depth to the top of the seasonal high water table: 0.0 to 30.0 centimeters
Water table kind: Apparent
Flooding: Occasional for periods of brief duration
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Figure 6.—An area of Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded in a narrow drainageway on Tar Kilne Ridge. Common understory plants in this map unit are American climbing fern (*Lygodium palmatum*), cinnamon fern (*Osmunda cinnamonea*), and sphagnum moss.

Typical Profile
0 to 15 centimeters; silt loam
15 to 117 centimeters; loam
117 to 157 centimeters; fine sandy loam

Interpretive Groups
Land capability classification: 3w
Prime farmland: Farmland of statewide importance
Hydric soil: Yes
Hydric criteria: 2B3

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High

Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; loam
25 to 56 centimeters; sandy clay loam
56 to 76 centimeters; sandy loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 4e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The bedrock restricts the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- Flooding may damage crops.
- The seasonal high water table restricts equipment operation, decreases the viability of crops, and interferes with the planting and harvesting of crops.
- Flooding may damage pastures.
- The seasonal high water table can affect equipment use, grazing patterns, and the viability of grass and legume species.
- The bedrock may restrict the rooting depth of plants.
- Compaction may occur when the soil is wet.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should focus on streamside management zones and stream crossings and should include general adherence to all applicable best management practices.
- Flooding may damage hiking, horse, and multi-use trails.
- Soil wetness may limit the use of horses and off-road vehicles.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

Az—Atkins-Skidmore complex, frequently flooded

Elevation: 213 to 305 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Atkins, frequently flooded and similar soils: 45 percent
Skidmore, frequently flooded and similar soils: 40 percent

Contrasting soils: Cotaco soils—6 percent; Pope soils—4 percent; Lily soils—3 percent; Ramsey soils—2 percent

Description of Atkins

Setting
Landform: Flood plain on dissected plateau
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Fine-loamy alluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Poorly drained
Organic matter content in the surface layer: 2.0 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: High—about 23.6 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Negligible
Depth to the top of the seasonal high water table: 0.0 to 30.0 centimeters
Water table kind: Apparent
Flooding: Frequent for periods of brief duration
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 15 centimeters; loam
15 to 117 centimeters; loam
117 to 157 centimeters; fine sandy loam

Interpretive Groups
Land capability classification: 3w
Prime farmland: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Hydric soil: Yes
Hydric criteria: 2B3

Description of Skidmore

Setting
Landform: Flood plain on dissected plateau
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal alluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 1.0 to 3.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 14.4 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Very low
Depth to the top of the seasonal high water table: 152.0 to 203.0 centimeters
Water table kind: Apparent

Flooding: Rare
Ponding: None
Surface layer texture: Channery fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 8 centimeters; channery fine sandy loam
8 to 28 centimeters; extremely channery sandy loam
28 to 86 centimeters; extremely channery loamy sand
86 to 156 centimeters; very channery loamy sand

Interpretive Groups
Land capability classification: 2w
Prime farmland: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Hydric soil: No

Use and Management Concerns

- Frequent flooding restricts the use of winter grain crops.
- Flooding may damage crops.
- The seasonal high water table restricts equipment operation, decreases the viability of crops, and interferes with the planting and harvesting of crops.
- Flooding may damage pastures.
- The seasonal high water table can affect equipment use, grazing patterns, and the viability of grass and legume species.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should focus on streamside management zones and stream crossings and should include general adherence to all applicable best management practices.
- Flooding may damage hiking, horse, and multi-use trails.
- Soil wetness may limit the use of horses and off-road vehicles.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.
- The low strength interferes with the construction of trails, especially multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

GaC—Gilpin silt loam, 5 to 12 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin and similar soils: 89 percent
Contrasting soils: Lonewood soils—8 percent; Lily soils—3 percent

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GaD—Gilpin silt loam, 12 to 20 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin and similar soils: 85 percent
Contrasting soils: Lily soils—7 percent; Sequoia soils—5 percent; Ramsey soils—3 percent

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 4e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.

- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GbF—Gilpin-Bouldin complex, 20 to 75 percent slopes, very stony

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin, stony and similar soils: 47 percent
Bouldin, stony and similar soils: 42 percent
Contrasting soils: Lily soils—4 percent; Ramsey soils—3 percent; Jefferson soils—2 percent; Shelocta soils—2 percent

Description of Gilpin

Setting
Landform: Gorge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Very high
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam

58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Description of Bouldin

Setting
Landform: Gorge on dissected plateau
Landform position (three-dimensional): Head slope and base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy-skeletal colluvium derived from sandstone

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 1.0 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 12.2 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Very high
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Very bouldery fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 15 centimeters; very bouldery fine sandy loam
15 to 33 centimeters; very bouldery loam
33 to 203 centimeters; very bouldery loam

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- These soils are unsuited to pasture and hayland.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for planting and seeding is impractical.
- The slope makes the use of mechanical planting equipment impractical.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.

- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GdF—Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin, stony and similar soils: 35 percent
Bouldin, stony and similar soils: 30 percent
Petros, stony and similar soils: 25 percent
Contrasting soils: Lily soils—5 percent; Shelocta soils—5 percent

Description of Gilpin

Setting
Landform: Gorge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Very high
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Description of Bouldin

Setting
Landform: Gorge on dissected plateau
Landform position (three-dimensional): Head slope and base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy-skeletal colluvium derived from sandstone

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 1.0 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 12.2 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Very high
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Very bouldery fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 15 centimeters; very bouldery fine sandy loam
15 to 33 centimeters; very bouldery loam
33 to 203 centimeters; very bouldery loam

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Description of Petros

Setting
Landform: Gorge on dissected plateau
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy-skeletal residuum weathered from shale and siltstone

Soil Properties and Qualities
Depth class: Shallow
Drainage class: Excessively drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Very low—about 3.1 centimeters to a depth of 41 centimeters
Depth to restrictive features: 25 to 51 centimeters to paralithic bedrock
Potential for surface runoff: Very high
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Channery silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 5 centimeters; channery silt loam
5 to 20 centimeters; very channery silt loam
20 to 41 centimeters; extremely channery silt loam
41 to 66 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- These soils are unsuited to pasture and hayland.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality, especially in areas on steeper slopes.
- A resource management plan should focus on the proper location of hiking, horse, and multi-use trails, and careful attention should be given to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for planting and seeding is impractical.
- The slope makes the use of mechanical planting equipment impractical.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GpE—Gilpin-Petros complex, 20 to 35 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin and similar soils: 55 percent
Petros and similar soils: 35 percent
Contrasting soils: Sequoia soils—5 percent; Lily soils—3 percent; Shelocta soils—2 percent

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Description of Petros

Setting
Landform: Ridge on plateau
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy-skeletal residuum weathered from shale and siltstone

Soil Properties and Qualities
Depth class: Shallow
Drainage class: Excessively drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Very low—about 3.1 centimeters to a depth of 41 centimeters
Depth to restrictive features: 25 to 51 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Channery silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 5 centimeters; channery silt loam
5 to 20 centimeters; very channery silt loam

20 to 41 centimeters; extremely channery silt loam
41 to 66 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- These soils are unsuited to pasture and hayland.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope makes the use of mechanical planting equipment impractical.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GpF—Gilpin-Petros complex, 35 to 75 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin and similar soils: 55 percent
Petros and similar soils: 35 percent
Contrasting soils: Sequoia soils—5 percent; Lily soils—3 percent; Shelocta soils—2 percent

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Description of Petros

Setting
Landform: Ridge on plateau
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy-skeletal residuum weathered from shale and siltstone

Soil Properties and Qualities
Depth class: Shallow
Drainage class: Excessively drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Very low—about 3.1 centimeters to a depth of 41 centimeters
Depth to restrictive features: 25 to 51 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Channery silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 5 centimeters; channery silt loam
5 to 20 centimeters; very channery silt loam
20 to 41 centimeters; extremely channery silt loam
41 to 66 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- These soils are unsuited to pasture and hayland.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality, especially in areas on steeper slopes.
- A resource management plan should focus on the proper location of hiking, horse, and multi-use trails, and careful attention should be given to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for planting and seeding is impractical.
- The slope makes the use of mechanical planting equipment impractical.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GsB—Gilpin-Sequoia complex, 2 to 5 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin and similar soils: 63 percent
Sequoia and similar soils: 30 percent
Contrasting soils: Lily soils—4 percent; Alticrest soils—3 percent

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained

Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 2e
Prime farmland: All areas are prime farmland
Hydric soil: No

Description of Sequoia

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from acid shale

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 86 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Moderate

Typical Profile
0 to 13 centimeters; silt loam
13 to 50 centimeters; silty clay loam
50 to 86 centimeters; silty clay
86 to 111 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 2e
Prime farmland: All areas are prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock and high clay content restrict the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GsC—Gilpin-Sequoia complex, 5 to 12 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin and similar soils: 63 percent
Sequoia and similar soils: 30 percent
Contrasting soils: Lily soils—4 percent; Alticrest soils—3 percent

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam

18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Description of Sequoia

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from acid shale

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 86 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Moderate

Typical Profile
0 to 13 centimeters; silt loam
13 to 50 centimeters; silty clay loam
50 to 86 centimeters; silty clay
86 to 111 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock and high clay content restrict the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.

- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

GsD—Gilpin-Sequoia complex, 12 to 20 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Gilpin and similar soils: 55 percent
Sequoia and similar soils: 30 percent
Contrasting soils: Lily soils—8 percent; Alticrest soils—4 percent; Ramsey soils—3 percent

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 4e
Prime farmland: Not prime farmland
Hydric soil: No

Description of Sequoia

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from acid shale

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 86 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Moderate

Typical Profile
0 to 13 centimeters; silt loam
13 to 50 centimeters; silty clay loam
50 to 86 centimeters; silty clay
86 to 111 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 4e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock and high clay content restrict the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.

- The stickiness of the soil reduces the efficiency of mechanical planting equipment. Refer to the section “Use and Management of the Soils” for more information.

ItE—Itmann very parachannery loam, 4 to 55 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Itmann, unstable fill and similar soils: 90 percent
Contrasting soils: Stonecoal, unstable fill soils—6 percent; Pope soils—4 percent

Description of Itmann

Setting
Landform: Spoil pile on ridge on dissected plateau
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope and base slope
Down-slope shape: Convex and linear
Across-slope shape: Convex
Parent material: Coal extraction mine spoil derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Somewhat excessively drained
Organic matter content in the surface layer: 0.0 to 0.5 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 13.7 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Very parachannery loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 10 centimeters; very parachannery loam
10 to 200 centimeters; very parachannery loam

Interpretive Groups
Land capability classification: 8
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- This soil is unsuited to cropland.
- This soil is unsuited to pasture and hayland.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.

- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for planting and seeding is impractical.
- The slope makes the use of mechanical planting equipment impractical.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.

Refer to the section “Use and Management of the Soils” for more information.

LdB—Lily loam, 2 to 5 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 90 percent
Contrasting soils: Alticrest soils—7 percent; Ramsey soils—3 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Very low
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; loam
25 to 56 centimeters; sandy clay loam
56 to 76 centimeters; sandy loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 2e

Prime farmland: All areas are prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The limited available water capacity may cause plants to suffer from moisture stress.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails. Refer to the section “Use and Management of the Soils” for more information.

LdC—Lily loam, 5 to 12 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 83 percent
Contrasting soils: Alticrest soils—8 percent; Gilpin soils—5 percent; Ramsey soils—4 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Low
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; loam
25 to 56 centimeters; sandy clay loam

56 to 76 centimeters; sandy loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The limited available water capacity may cause plants to suffer from moisture stress.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

LdD—Lily loam, 12 to 20 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 85 percent
Contrasting soils: Alticrest soils—7 percent; Ramsey soils—5 percent; Gilpin soils—3 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Low
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None

Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; loam
25 to 56 centimeters; sandy clay loam
56 to 76 centimeters; sandy loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 4e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The limited available water capacity may cause plants to suffer from moisture stress.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

LgC—Lily-Gilpin complex, 5 to 12 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 50 percent
Gilpin and similar soils: 40 percent
Contrasting soils: Lonewood soils—3 percent; Wernock soils—3 percent; Ramsey soils—2 percent; Sequoia soils—2 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; fine sandy loam
25 to 56 centimeters; sandy clay loam
56 to 76 centimeters; sandy loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam

58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment. Refer to the section “Use and Management of the Soils” for more information.

LgD—Lily-Gilpin complex, 12 to 20 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 60 percent
Gilpin and similar soils: 35 percent
Contrasting soils: Alticrest soils—3 percent; Ramsey soils—2 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None

Ponding: None
Surface layer texture: Fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; fine sandy loam
25 to 56 centimeters; sandy clay loam
56 to 76 centimeters; sandy loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 4e
Prime farmland: Not prime farmland
Hydric soil: No

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 4e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.

- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

LgE—Lily-Gilpin complex, 20 to 35 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 55 percent
Gilpin and similar soils: 30 percent
Contrasting soils: Sequoia soils—8 percent; Ramsey soils—7 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; fine sandy loam
25 to 56 centimeters; sandy clay loam
56 to 76 centimeters; sandy loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 6e
Prime farmland: Not prime farmland
Hydric soil: No

Description of Gilpin

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Low—about 12.3 centimeters to a depth of 84 centimeters
Depth to restrictive features: 51 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 18 centimeters; silt loam
18 to 58 centimeters; loam
58 to 84 centimeters; channery silty clay loam
84 to 109 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 6e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- The hazard of erosion, the rate of surface runoff, and the amount of nutrient loss are increased because of the slope.
- The slope may restrict the use of some farm equipment.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope makes the use of mechanical planting equipment impractical.

Figure 7.—An area of Lily-Ramsey complex, 5 to 12 percent slopes.

- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

LmC—Lily-Ramsey complex, 5 to 12 percent slopes

Elevation: 244 to 759 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 65 percent
Ramsey and similar soils: 30 percent
Contrasting soils: Alticrest soils—3 percent; Totz soils—2 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau (fig. 7)
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep

Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; fine sandy loam
25 to 56 centimeters; fine sandy loam
56 to 76 centimeters; sandy clay loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 6e
Prime farmland: Not prime farmland
Hydric soil: No

Description of Ramsey

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Somewhat excessively drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Very low—about 4.7 centimeters to a depth of 41 centimeters
Depth to restrictive features: 18 to 51 centimeters to lithic bedrock
Potential for surface runoff: Very low
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 10 centimeters; loam
10 to 25 centimeters; fine sandy loam
25 to 41 centimeters; channery sandy loam
41 to 66 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 6e

Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- The hazard of erosion, the rate of surface runoff, and the amount of nutrient loss are increased because of the slope.
- The limited available water capacity may cause plants to suffer from moisture stress during the drier summer months.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

LmD—Lily-Ramsey complex, 12 to 20 percent slopes

Elevation: 244 to 759 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 60 percent
Ramsey and similar soils: 35 percent
Contrasting soils: Alticrest soils—3 percent; Totz soils—2 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters

Flooding: None
Ponding: None
Surface layer texture: Fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; fine sandy loam
25 to 56 centimeters; fine sandy loam
56 to 76 centimeters; sandy clay loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 6e
Prime farmland: Not prime farmland
Hydric soil: No

Description of Ramsey

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Somewhat excessively drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Very low—about 4.7 centimeters to a depth of 41 centimeters
Depth to restrictive features: 18 to 51 centimeters to lithic bedrock
Potential for surface runoff: Very low
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 10 centimeters; loam
10 to 25 centimeters; fine sandy loam
25 to 41 centimeters; channery sandy loam
41 to 66 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 6e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- The hazard of erosion, the rate of surface runoff, and the amount of nutrient loss are increased because of the slope.

- The limited available water capacity may cause plants to suffer from moisture stress during the drier summer months.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

LmE—Lily-Ramsey complex, 20 to 35 percent slopes

Elevation: 244 to 759 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lily and similar soils: 60 percent
Ramsey and similar soils: 35 percent
Contrasting soils: Alticrest soils—3 percent; Jefferson soils—2 percent

Description of Lily

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 10.5 centimeters to a depth of 76 centimeters
Depth to restrictive features: 51 to 102 centimeters to lithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Fine sandy loam

Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 25 centimeters; fine sandy loam
25 to 56 centimeters; fine sandy loam
56 to 76 centimeters; sandy clay loam
76 to 101 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 7e
Prime farmland: Not prime farmland
Hydric soil: No

Description of Ramsey

Setting
Landform: Ridge on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Somewhat excessively drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Very low—about 4.7 centimeters to a depth of 41 centimeters
Depth to restrictive features: 18 to 51 centimeters to lithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 10 centimeters; loam
10 to 25 centimeters; fine sandy loam
25 to 41 centimeters; channery sandy loam
41 to 66 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 7e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- These soils are unsuited to pasture and hayland.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the

construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope makes the use of mechanical planting equipment impractical.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

LoB—Lonewood silt loam, 2 to 5 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lonewood and similar soils: 80 percent
Contrasting soils: Lily soils—7 percent; Hendon soils—3 percent; Gilpin soils—2 percent; Ramsey soils—2 percent; Sequoia soils—2 percent; Tilsit soils—2 percent; Wernock soils—2 percent

Description of Lonewood

Setting
Landform: Interfluve on dissected plateau (fig. 8)
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 1.0 to 3.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: High—about 24.6 centimeters to a depth of 150 centimeters
Depth to restrictive features: 102 to 183 centimeters to paralithic bedrock
Potential for surface runoff: Low
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 20 centimeters; silt loam
20 to 71 centimeters; silt loam
71 to 150 centimeters; clay loam
150 to 175 centimeters; weathered bedrock

Figure 8.—An area of Lonewood silt loam, 2 to 5 percent slopes, on an interfluve along Duncan Hollow Road north of the Bandy Creek Visitors' Center.

Interpretive Groups
Land capability classification: 2e
Prime farmland: All areas are prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The low strength interferes with the construction of trails, especially multi-use trails. Refer to the section "Use and Management of the Soils" for more information.

LoC—Lonewood silt loam, 5 to 12 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Lonewood and similar soils: 90 percent
Contrasting soils: Lily soils—7 percent; Gilpin soils—2 percent; Wernock soils—1 percent

Description of Lonewood

Setting
Landform: Hill on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 1.0 to 3.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: High—about 24.6 centimeters to a depth of 150 centimeters
Depth to restrictive features: 102 to 183 centimeters to paralithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 20 centimeters; silt loam
20 to 71 centimeters; silt loam
71 to 150 centimeters; clay loam
150 to 175 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- The low strength interferes with the construction of trails, especially multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

Ps—Pope-Skidmore complex, 0 to 4 percent slopes, frequently flooded

Elevation: 213 to 305 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Pope, frequently flooded and similar soils: 55 percent
Skidmore, frequently flooded and similar soils: 40 percent
Contrasting soils: Philo soils—5 percent

Description of Pope

Setting
Landform: Flood plain on dissected plateau
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sandstone and shale

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 1.0 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Moderate—about 21.7 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Very low
Depth to the top of the seasonal high water table: 152.0 to 183.0 centimeters
Water table kind: Apparent
Flooding: Frequent for periods of very brief duration
Ponding: None
Surface layer texture: Loamy sand
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 8 centimeters; loamy sand
8 to 58 centimeters; sand
58 to 188 centimeters; fine sandy loam

Interpretive Groups
Land capability classification: 2w
Prime farmland: Prime farmland if protected from flooding or not frequently flooded during the growing season
Hydric soil: No

Description of Skidmore

Setting
Landform: Flood plain on dissected plateau
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal alluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 1.0 to 3.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 14.4 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Very low
Depth to the top of the seasonal high water table: 152.0 to 203.0 centimeters
Water table kind: Apparent
Flooding: Frequent for periods of very brief duration
Ponding: None
Surface layer texture: Channery fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 8 centimeters; channery fine sandy loam
8 to 28 centimeters; very channery sandy loam
28 to 86 centimeters; extremely channery loamy sand
86 to 156 centimeters; very channery loamy sand

Interpretive Groups
Land capability classification: 2w
Prime farmland: Prime farmland if protected from flooding or not frequently flooded during the growing season
Hydric soil: No

Use and Management Concerns

- Frequent flooding restricts the use of winter grain crops.
- Flooding may damage crops.
- Flooding may damage pastures.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should focus on streamside management zones and stream crossings and should include general adherence to all applicable best management practices.
- Flooding may damage hiking, horse, and multi-use trails.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

RaF—Rock outcrop-Ramsey complex, 20 to 70 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Figure 9.—An area of Rock outcrop-Ramsey complex, 20 to 70 percent slopes. This map unit includes the exposed caprock that lies along the upper rim of the gorges.

Map Unit Composition

Rock outcrop: 60 percent
Ramsey and similar soils: 40 percent
Contrasting soils: None

Description of Rock Outcrop

Setting
Landform: Gorge on dissected plateau (fig. 9)
Landform position (three-dimensional): Free face
Parent material: Sandstone

Interpretive Groups
Land capability classification: None assigned
Prime farmland: Not prime farmland
Hydric soil: No

Description of Ramsey

Setting
Landform: Gorge on dissected plateau
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from sandstone

Soil Properties and Qualities
Depth class: Very deep

Drainage class: Somewhat excessively drained
Organic matter content in the surface layer: 0.5 to 2.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Very low—about 4.7 centimeters to a depth of 41 centimeters
Depth to restrictive features: 18 to 51 centimeters to lithic bedrock
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 10 centimeters; loam
10 to 25 centimeters; fine sandy loam
25 to 41 centimeters; channery sandy loam
41 to 66 centimeters; unweathered bedrock

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- Onsite investigation is needed to determine the suitability for specific uses.
- This map unit is unsuited to cropland.
- The Ramsey soil is unsuited to use as cropland because of the slope and the erosion hazard.
- Rock outcrops may limit machinery operations.
- This map unit is not recommended for pastureland.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- Because of the slope, the use of equipment for planting and seeding is impractical.
- The slope makes the use of mechanical planting equipment impractical.

Refer to the section “Use and Management of the Soils” for more information.

SaC—Shelocta silt loam, 5 to 12 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Shelocta and similar soils: 90 percent
Contrasting soils: Gilpin soils—5 percent; Sequoia soils—5 percent

Description of Shelocta

Setting
Landform: Hillslopes on dissected plateau
Landform position (three-dimensional): Base slope

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Fine-loamy colluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 5.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Moderate—about 22.2 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 23 centimeters; loam
23 to 140 centimeters; channery silty clay loam
140 to 193 centimeters; channery silt loam

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- The low strength interferes with the construction of trails, especially multi-use trails. Refer to the section “Use and Management of the Soils” for more information.

SaD—Shelocta silt loam, 12 to 20 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Shelocta and similar soils: 90 percent
Contrasting soils: Gilpin soils—5 percent; Sequoia soils—5 percent

Description of Shelocta

Setting
Landform: Hillslopes on dissected plateau
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Fine-loamy colluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 5.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Moderate—about 22.2 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 23 centimeters; loam
23 to 140 centimeters; channery silty clay loam
140 to 193 centimeters; channery silt loam

Interpretive Groups
Land capability classification: 4e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.
- The slope may restrict the use of some mechanical planting equipment.
- The low strength interferes with the construction of trails, especially multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

SaE—Shelocta silt loam, 20 to 35 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters

Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Shelocta and similar soils: 90 percent
Contrasting soils: Gilpin soils—5 percent; Sequoia soils—5 percent

Description of Shelocta

Setting
Landform: Hillslopes on dissected plateau
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Fine-loamy colluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 5.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Moderate—about 22.2 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 23 centimeters; loam
23 to 140 centimeters; channery silty clay loam
140 to 193 centimeters; channery silt loam

Interpretive Groups
Land capability classification: 6e
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- This soil is unsuited to cropland.
- The hazard of erosion, the rate of surface runoff, and the amount of nutrient loss are increased because of the slope.
- The slope may restrict the use of some farm equipment.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for preparing sites for planting and seeding is restricted.

Figure 10.—An area of Shelocta-Bouldin complex, 30 to 75 percent slopes, extremely stony, very rocky, on the side slopes of the gorge below the sandstone escarpment. An area of Rock outcrop-Ramsey complex, 20 to 70 percent slopes, is on the sandstone escarpment.

- The slope makes the use of mechanical planting equipment impractical.
- The low strength interferes with the construction of trails, especially multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

SbF—Shelocta-Bouldin complex, 30 to 75 percent slopes, extremely stony, very rocky

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Shelocta, extremely stony and similar soils: 45 percent
Bouldin, extremely stony and similar soils: 25 percent
Contrasting soils: Gilpin soils—5 percent; Ramsey soils—5 percent; Rock outcrop—5 percent; Wallen soils—5 percent; Kimper soils—2 percent; Muse soils—2 percent; Wernock soils—2 percent; Alticrest soils—1 percent; Craigsville soils—1 percent; Lily soils—1 percent; Sequoia soils—1 percent

Description of Shelocta

Setting
Landform: Gorge on dissected plateau (fig. 10)
Landform position (three-dimensional): Base slope

Down-slope shape: Concave
Across-slope shape: Concave and linear
Parent material: Fine-loamy colluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 5.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Moderate—about 22.2 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: High
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 23 centimeters; loam
23 to 140 centimeters; channery silty clay loam
140 to 193 centimeters; channery silt loam

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Description of Bouldin

Setting
Landform: Gorge on dissected plateau
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope and head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy-skeletal colluvium derived from sandstone and shale

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Somewhat excessively drained
Organic matter content in the surface layer: 1.0 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): High
Available water capacity: Low—about 12.2 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Very bouldery fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 15 centimeters; very bouldery fine sandy loam

15 to 33 centimeters; very bouldery loam
33 to 203 centimeters; very bouldery loam

Interpretive Groups
Land capability classification: 7s
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- These soils are unsuited to cropland.
- These soils are unsuited to pasture and hayland.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality, especially in areas on steeper slopes.
- A resource management plan should focus on the proper location of hiking, horse, and multi-use trails, and careful attention should be given to all applicable best management practices.
- The slope poses safety hazards and creates a potential for erosion during the construction or maintenance of hiking, biking, horse, and multi-use trails.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- Because of the slope, the use of equipment for planting and seeding is impractical.
- The slope makes the use of mechanical planting equipment impractical.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- The low strength interferes with the construction of trails, especially multi-use trails. Refer to the section “Use and Management of the Soils” for more information.

Sk—Skidmore very gravelly sandy loam, 0 to 10 percent slopes, frequently flooded

Elevation: 213 to 305 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Skidmore, frequently flooded and similar soils: 100 percent
Contrasting soils: None

Description of Skidmore

Setting
Landform: Gravelly and narrow flood plain on dissected plateau
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy-skeletal alluvium derived from interbedded sedimentary rock

Soil Properties and Qualities
Depth class: Very deep
Drainage class: Somewhat excessively drained
Organic matter content in the surface layer: 1.0 to 3.0 percent
Saturated hydraulic conductivity (K_{sat}): High

Available water capacity: Low—about 14.4 centimeters to a depth of 152 centimeters
Depth to restrictive features: Greater than 203 centimeters
Potential for surface runoff: Very low
Depth to the top of the seasonal high water table: 122.0 to 152.0 centimeters
Water table kind: Apparent
Flooding: Frequent for periods of very brief duration
Ponding: None
Surface layer texture: Channery fine sandy loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 8 centimeters; channery fine sandy loam
8 to 28 centimeters; very channery sandy loam
28 to 86 centimeters; extremely channery loamy sand
86 to 156 centimeters; very channery loamy sand

Interpretive Groups
Land capability classification: 2w
Prime farmland: Not prime farmland
Hydric soil: No

Use and Management Concerns

- Frequent flooding restricts the use of winter grain crops.
- Flooding may damage crops.
- Flooding may damage pastures.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should focus on streamside management zones and stream crossings and should include general adherence to all applicable best management practices.
- Flooding may damage hiking, horse, and multi-use trails.
- The use of mechanical planting equipment is impractical because of the content of rock fragments.
- Rock fragments restrict the use of equipment during site preparation for planting or seeding.
- Coarse textured soil layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Coarse textured soil layers increase the maintenance of multi-use trails.

Refer to the section “Use and Management of the Soils” for more information.

W—Water

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C

Map Unit Composition

Water and similar soils: 100 percent

Description of Water

Setting
Landform: None assigned
Parent material: Water

Interpretive Groups
Land capability classification: None assigned
Prime farmland: Not prime farmland
Hydric soils: No

Use and Management Concerns

Onsite investigation is needed to determine the suitability for specific uses. Refer to the section “Use and Management of the Soils” for more information.

WnB—Wernock silt loam, 2 to 5 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Wernock and similar soils: 92 percent
Contrasting soils: Lily soils—6 percent; Lonewood soils—2 percent

Description of Wernock

Setting
Landform: Hill on dissected plateau
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from sandstone and siltstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Moderate—about 18.1 centimeters to a depth of 89 centimeters
Depth to restrictive features: 76 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Low
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 30 centimeters; silt loam
30 to 69 centimeters; silty clay loam
69 to 89 centimeters; silty clay loam
89 to 114 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 2e
Prime farmland: All areas are prime farmland
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

WnC—Wernock silt loam, 5 to 12 percent slopes

Elevation: 244 to 500 meters
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 5 to 19 degrees C
Frost-free period: 139 to 187 days

Map Unit Composition

Wernock and similar soils: 92 percent
Contrasting soils: Lily soils—6 percent; Lonewood soils—2 percent

Description of Wernock

Setting
Landform: Hill on dissected plateau
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from sandstone and siltstone

Soil Properties and Qualities
Depth class: Moderately deep
Drainage class: Well drained
Organic matter content in the surface layer: 0.5 to 4.0 percent
Saturated hydraulic conductivity (K_{sat}): Moderately high
Available water capacity: Moderate—about 18.1 centimeters to a depth of 89 centimeters
Depth to restrictive features: 76 to 102 centimeters to paralithic bedrock
Potential for surface runoff: Medium
Depth to the top of the seasonal high water table: Greater than 2 meters
Flooding: None
Ponding: None
Surface layer texture: Silt loam
Calcium carbonate maximum: 0 percent
Shrink-swell potential: Low

Typical Profile
0 to 30 centimeters; silt loam

30 to 69 centimeters; silty clay loam
69 to 89 centimeters; silty clay loam
89 to 114 centimeters; weathered bedrock

Interpretive Groups
Land capability classification: 3e
Prime farmland: Farmland of statewide importance
Hydric soil: No

Use and Management Concerns

- The rate of surface runoff, the erosion hazard, and the amount of nutrient loss are increased because of the slope.
- The bedrock restricts the rooting depth of crops.
- The risk of compaction increases when the soil is wet.
- Soil crusting results in a decrease in water infiltration and hinders the emergence of seedlings.
- The bedrock may restrict the rooting depth of plants.
- Proper planning for resource management is essential in order to minimize the potential negative impact to soil and water quality.
- A resource management plan should include general adherence to all applicable best management practices.
- The slope creates unsafe operating conditions and reduces the operating efficiency of off-road vehicles.
- The slope may restrict the use of some mechanical planting equipment.
- Bedrock may interfere with the construction of trails.
- The low strength interferes with the construction of trails, especially multi-use trails.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Refer to the section “Use and Management of the Soils” for more information.

Use and Management of the Soils

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

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

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

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

Contractors can use this survey to help 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.

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

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify some of 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, slightly limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact

on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

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

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

Yields per Acre

The average yields per acre that can be expected of the principal crops grown under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

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

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable 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 residues, manure, and green manure crops; and harvesting that ensures the smallest possible loss.

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

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide more information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for production of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for crop production, the risk of damage by erosion if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major landshaping that would change slope, depth, or other characteristics of the soils, nor do they include major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestry, for engineering, or for environmental or residential purposes.

In the capability system, soils are generally grouped at two levels—capability class and subclass (USDA-SCS, 1961).

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 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 are unsuited for commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w,* or *s* 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.

In classes 1 and 8 there are no subclasses. Class 5 contains only the subclasses indicated by *w* or *s,* because the soils in class 5 are subject to little or no erosion. They have other significant limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The acreage of soils in each capability class or subclass is shown in table 6. The capability classification of map units in this survey area is given in the section “Detailed Soil Map Units” and in the yields table.

Prime Farmland and Other Important Farmlands

Table 7 lists the map units in the survey area that are considered prime farmland, unique farmland, or farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation’s food supply.

Prime farmland 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 quality, 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. The water supply is dependable and of adequate quality. Prime farmland 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 areas 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.

For some soils identified in the table as prime farmland, 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.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Major Land Resource Areas

A major land resource area (MLRA) is a broad geographic area that has a distinct combination of climate, topography, elevation, potential natural vegetation, soils, hydrology, land use, and general type farming (USDA-NRCS, 2005). The Big South Fork NRRA is located entirely within Major Land Resource Area 125—Cumberland Plateau and Mountains. MLRA 125 is comprised of two sections: the Cumberland Plateau and the Cumberland Mountains. The Big South Fork NRRA is located in the Cumberland Plateau section of the MLRA.

On the Cumberland Plateau, the climate is cooler due to an increase in elevation from surrounding areas. Water is abundant for most of the area. In most years precipitation is adequate for crops, but in some years yields are reduced by droughts.

The water in streams and rivers generally is suitable for all uses, although some sedimentation in surface-mined areas and local acid mine drainage cause problems in northern Tennessee and in Kentucky, Virginia, and West Virginia (USDA-NRCS, 2005).

Most of the soils in the undulating to rolling areas on the Cumberland Plateau are Hapludults. Moderately deep or deep, well drained, loamy Hapludults (Lily and Lonewood series) formed from sandstone residuum. Shallow, somewhat excessively well drained, loamy Dystrudepts (Ramsey series) also formed in sandstone residuum. The dominant soils in the hilly to steep areas that formed in residuum from interbedded siltstone and shale are Hapludults (Gilpin and Wernock series) and Dystrudepts (Petros series). They are shallow to moderately deep, well drained to somewhat excessively well drained, and loamy. Soils on steep and very steep slopes that formed in gravelly or stony colluvium formed from sandstone, siltstone, or shale. These deep or very deep, well drained, and loamy soils are Hapludults and Paleudults (Shelocta and Bouldin series).

Soils on the flood plains are of small extent on the Cumberland Plateau and are slightly more extensive in the Cumberland Mountains (USDA-NRCS, 2005). The soils on the flood plains that are well drained or moderately well drained are Dystrudepts (Pope series) and Eutrudepts (Skidmore series). The poorly drained soils, Endoaquepts (Atkins series), are also deep to very deep, are loamy, and formed in alluvium from sandstone and shale (USDA-NRCS, 2005).

Material derived from surface and deep mines is common in this major land resource area. Udorthents (Itmann series) formed in this material.

In the survey area, the land was formerly used for timber production and deep or surface mining was common. A small percentage of the area was formerly used for crops, hay, and pasture.

Hydric Soils

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

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

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

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (USDA-NRCS, 1999) and “Keys to Soil Taxonomy” (USDA-NRCS, 2006) and in the “Soil Survey Manual” (USDA-NRCS, 1993).

If soils are wet enough for a long enough period to be considered hydric, they

should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in “Field Indicators of Hydric Soils in the United States” (Hurt and others, 1996).

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

Table 8 shows the map units that have components that 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; Hurt and others, 1996).

Map units that are made up of hydric soils or include hydric soils may also include non-hydric soils in the higher positions on the landform. Other map units that are made up primarily of nonhydric soils may also include hydric soil components in the lower-lying positions. Each major component that is hydric is indicated in the “Detailed Soil Map Units” section.

Forestland Productivity and Land Management

The tables in this section show the potential productivity of the soils and rate the soils according to the limitations that affect various aspects of forest management.

Table 9 lists the plant symbols, common names, and scientific names for the overstory and understory plants that were recorded in the survey area.

Forestland Productivity

In table 10, the *potential productivity* of *characteristic trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. The *site index base age* indicates the age used for the site curves. Characteristic trees are those that forest managers generally favor in intermediate or improvement cuttings and are selected on the basis of soil suitability, growth rate, quality, value, and current marketability. More detailed information regarding site index is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

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

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

Land Management

In tables 11a through 11d, interpretive ratings are given for various aspects of forestland management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified forest management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance

can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming these unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

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

Rating class terms for fire damage, utilized in substory management, and seedling mortality are expressed as *low, moderate,* and *high*. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management practices. More detailed information about the criteria used in the ratings is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Ratings in the column *hazard of off-road or off-trail erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance; and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately well suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock

fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forestry equipment, foot and equestrian traffic, mountain bike traffice, and multi-use vehicle operation. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential windthrow hazard* indicate the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. Not considered in the ratings, but important in evaluating a site, are the types and spacing of trees, and exposure to prevailing winds. The ratings evaluate soil properties only, and it is assumed that all sites have equal exposure to sustained high winds. The windthrow hazard is described as low, moderate, or high. A rating of *low* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *high* indicates that many trees can be blown down during these periods.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table or bedrock, soil reaction, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

Recreation

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

reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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

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

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

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a fragipan are the main concerns affecting the development of camp areas.

The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a fragipan, permeability, and toxic substances in the soil.

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

Foot traffic and equestrian trails 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.

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

Engineering

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

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

State ordinances and local regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Complying with local ordinances and regulations should be a consideration in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock, soil wetness, depth to a water table, ponding, slope, 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.

In a general way, 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, fill material, and topsoil; plan drainage 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 about the soils in this survey area, depending upon the use intended and the degree of confidence required.

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

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction modifications, performance after construction, and maintenance. Tables 13a and 13b show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

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

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

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

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

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

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet

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

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

Sanitary Facilities

Table 14 shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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

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

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

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level

floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a fragipan, flooding, large stones, and content of organic matter.

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

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

Construction Materials

Tables 15a and 15b give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

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

The soils are rated as *good, fair,* or *poor* source of sand and gravel. A rating of *good or fair* means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that the soil is an improbable source. A number between 0.00 and 1.00 indicates the degree to which the soil is a probable source of sand or gravel.

Gravel and *sand* 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 15a, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence in such a way that the reconstructed soil favors plant growth. In table 15b, the ratings do not apply to quarries and other mined or borrowed areas that require an off-site source of reconstruction material. The ratings are based on the soil properties that affect erosion, stability of the surface and subsoil, and the productive potential of the reconstructed soil. Some of these properties include the content of sodium, salts,

and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; content of organic matter; and other features that dominantly affect fertility and productivity.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In table 15b, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

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

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

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

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

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 *not limited* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *somewhat limited* 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 *very limited* 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.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect

performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

Aquifer-fed excavated ponds are pits 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.

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 particle-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. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Table 17 provides data on sampled soils. It lists the soil map unit symbol, pedon sample identification number, type of pedon sampled, soil map unit component name, laboratory where sampled was processed, and laboratory pedon number. All pedons for this survey were sampled at the National Soil Survey Center in Lincoln, Nebraska.

Engineering Index Properties

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

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

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 a mass of the soil. “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 gravel 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, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998).

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

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

other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

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

Rock fragments larger than 250 millimeters in diameter and 75 to 250 millimeters 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.

Physical Properties

Table 19, parts I and II, show 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 in inches.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In table 19, part I, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In the table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, 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 content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering, agronomic, residential, and commercial interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage, root penetration, 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 movement of water, roots, and air. Depending on soil texture, a bulk density of more than 1.4 restricts 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 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, depth to bedrock or a restrictive layer, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

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

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 19, part I, 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 residues to the soil, using no-till planting practices, maintaining the soil in permanent vegetative cover for long periods, spreading mulch on the surface, and leaving duff on the surface after timber operations. 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 plants and soil organisms.

Erosion factors are shown in table 19, part II, 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 six factors used in 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 water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

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

Chemical Properties

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

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

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0). 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.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

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.

Water Features

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

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

The four hydrologic soil groups are:

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

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a 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.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 21 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely gray colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 21 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams or rivers, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30

days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

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

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

Soil Features

Table 22 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical and chemical properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable rooting environment. Examples are bedrock, fragipans, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA-NRCS, 1999 and 2006). 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 23 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 Ultisol.

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 Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

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 Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols 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 Hapludults.

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, mineral content, soil temperature regime, clay activity, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, semiactive, mesic Typic Hapludults.

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 “National Soil Survey Manual” (USDA-NRCS, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (USDA-NRCS, 1999) and in “Keys to Soil Taxonomy” (USDA-NRCS, 2006). 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.

Atkins Series

Major land resource area: 125
Map unit(s):
Ak—Atkins loam, ponded
AyD—Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded
Az—Atkins-Skidmore complex, frequently flooded
Local phase(s): Ponded, occasionally flooded, and frequently flooded
Depth class: Very deep
Drainage class: Poorly drained
Saturated hydraulic conductivity (K_{sat}): Moderately high
Landform(s): Flood plain on dissected plateau
Parent material: Fine-loamy alluvium derived from interbedded sedimentary rock
Elevation: 213 to 500 meters
Slope: 0 to 3 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Fine-loamy, mixed, active, acid, mesic Fluvaquentic Endoaquepts

Typical Pedon

Location in survey area: Atkins silt loam in an area of Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded; in Big South Fork National River and Recreation Area, Fentress County, Tennessee; USGS Barthell SW, Tennessee topographic quadrangle; latitude 36 degrees 25 minutes 19.20 seconds north and longitude 84 degrees 47 minutes 4.80 seconds west; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 18 centimeters; dark grayish brown (10YR 4/2) broken face silt loam; moderate medium granular structure; very friable; common fine, common very fine, common medium, and common coarse roots throughout; common fine moderate-continuity dendritic tubular, common medium moderate-continuity tubular, and common very fine moderate-continuity dendritic tubular pores; 10 percent fine prominent dendritic strong brown (7.5YR 5/6) masses of oxidized iron with diffuse boundaries on surfaces along root channels; very strongly acid, pH 5.0; clear smooth boundary.

Bg1—18 to 56 centimeters; dark grayish brown (2.5Y 4/2) broken face loam; 1 percent medium faint spherical light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; friable; common fine, common very fine, and common medium roots throughout; common fine moderate-continuity dendritic tubular and common very fine moderate-continuity dendritic tubular pores; 10 percent fine prominent dendritic strong brown (7.5YR 5/6) masses of oxidized iron with diffuse boundaries on surfaces along root channels; very strongly acid, pH 5.0; clear smooth boundary.

Bg2—56 to 114 centimeters; 80 percent light brownish gray (2.5Y 6/2) broken face

loam; 10 percent medium faint spherical light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; friable; common fine and common medium roots throughout; 10 percent medium prominent dendritic strong brown (7.5YR 5/8) masses of oxidized iron with diffuse boundaries on surfaces along root channels and 10 percent medium prominent spherical brownish yellow (10YR 6/6) masses of oxidized iron with diffuse boundaries throughout; very strongly acid, pH 4.5; gradual wavy boundary.

Cg—114 to 156 centimeters; 70 percent light brownish gray (2.5Y 6/2) broken face fine sandy loam; 10 percent medium faint irregular light olive brown (2.5Y 5/3) mottles; massive; friable; 10 percent coarse prominent spherical strong brown (7.5YR 5/6) masses of oxidized iron with diffuse boundaries throughout and 10 percent medium prominent dendritic strong brown (7.5YR 5/6) masses of oxidized iron with clear boundaries on surfaces along root channels; very strongly acid, pH 4.5.

Range in Characteristics

Depth to restrictive feature: Greater than 203 centimeters
Diagnostic feature(s): Ochric epipedon, aquic conditions, and cambic horizon
Surface fragments: None
Seasonal high water table: January, February, March, April, May, June, July, August, September, October, November, and December
Depth to top of water table: 0 to 30 centimeters

A horizon(s):
Hue—10YR or 2.5Y
Value—2 to 7 moist
Chroma—1 to 4 moist
Redoximorphic features—hue of 5Y to 5YR, value of 4 or 5, and chroma of 2 to 8
Texture—loam, silt loam
Fragment content—0 to 15 percent
Reaction—pH 4.5 to 5.5
Organic matter content—2.0 to 4.0 percent

Bg horizon(s):
Hue—7.5YR to 5Y
Value—4 to 7 moist
Chroma—0 to 2 moist
Redoximorphic features—hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 8
Manganese and iron masses (where present)—hue of 2.5YR to 7.5YR, value of 2 to 3, and chroma of 0 to 2
Texture—silty clay loam, clay loam, loam, silt loam
Fragment content—0 to 15 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 0.8 percent

Cg horizon(s):
Hue—neutral or 7.5YR to 5PB
Value—4 to 7 moist
Chroma—0 to 8 moist
Texture—loam, gravelly sandy loam, fine sandy loam, gravelly loam, gravelly fine sandy loam
Fragment content—0 to 20 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 0.5 percent

Bouldin Series

Major land resource area: 125
Map unit(s):
GbF—Gilpin-Bouldin complex, 20 to 75 percent slopes, very stony
GdF—Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony
SbF—Shelocta-Bouldin complex, 30 to 75 percent slopes, extremely stony, very rocky
Depth class: Very deep
Drainage class: Well drained and somewhat excessively drained
Saturated hydraulic conductivity (K_{sat}): High
Landform(s): Gorge on dissected plateau
Landform position(s) (three-dimensional): Head slope and base slope
Parent material: Loamy-skeletal colluvium derived from sandstone and loamy-skeletal colluvium derived from sandstone and shale
Elevation: 244 to 500 meters
Slope: 20 to 75 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Loamy-skeletal, siliceous, subactive, mesic Typic Paleudults

Typical Pedon

Location in survey area: Bouldin very bouldery loam in an area of Gilpin-Bouldin complex, 20 to 75 percent slopes, very stony (fig. 11); in Big South Fork National River and Recreation Area, Scott County, Tennessee; USGS Barthell SW, Tennessee topographic quadrangle; latitude 36 degrees 34 minutes 33.20 seconds north and longitude 84 degrees 38 minutes 22.10 seconds west; UTM Zone 16, 711067 meters easting, 4050860 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 15 centimeters; brown (10YR 4/3) broken face very bouldery fine sandy loam; weak medium granular structure; very friable; many fine, many very fine, and many medium roots; many fine low-continuity dendritic tubular pores; 5 percent flat subrounded very strongly cemented 5- to 75-millimeter sandstone fragments, 5 percent flat subrounded very strongly cemented 2- to 5-millimeter sandstone fragments, 10 percent flat subrounded indurated 75- to 250-millimeter sandstone fragments, and 20 percent flat subrounded indurated 250- to 1000-millimeter sandstone fragments; very strongly acid, pH 5.0; diffuse wavy boundary.

BA—15 to 33 centimeters; dark yellowish brown (10YR 4/4) broken face very bouldery loam; weak medium subangular blocky structure; friable; many fine, many very fine, common medium, common coarse, and common very coarse roots; many fine dendritic tubular, many medium dendritic tubular, and many very fine dendritic tubular pores; 5 percent flat subrounded very strongly cemented 5- to 75-millimeter sandstone fragments, 5 percent flat subrounded very strongly cemented 2- to 5-millimeter sandstone fragments, 15 percent flat subrounded indurated 75- to 250-millimeter sandstone fragments, and 20 percent flat subrounded indurated 250- to 1000-millimeter sandstone fragments; very strongly acid, pH 5.0; diffuse wavy boundary.

Bt1—33 to 91 centimeters; strong brown (7.5YR 5/6) broken face very bouldery loam; moderate coarse subangular blocky structure; friable; common fine, common very fine, and few medium roots; common fine dendritic tubular, common medium dendritic tubular, and many very fine dendritic tubular pores; 30 percent discontinuous distinct strong brown (7.5YR 4/6) clay films on rock fragments and

Figure 11.—Typical profile of Bouldin very bouldery loam. Measurements are in inches.

on surfaces along root channels and on all faces of peds; 2 percent flat subrounded very strongly cemented 2- to 5-millimeter sandstone fragments, 3 percent flat subrounded very strongly cemented 5- to 75-millimeter sandstone fragments, 15 percent flat subrounded indurated 75- to 250-millimeter sandstone fragments, and 25 percent flat subrounded indurated 250- to 1000-millimeter sandstone fragments; very strongly acid, pH 5.0; diffuse wavy boundary.

Bt2—91 to 203 centimeters; strong brown (7.5YR 5/8) broken face very bouldery loam; moderate coarse subangular blocky structure; friable; common fine, few medium, and few coarse roots; common fine dendritic tubular, common medium dendritic tubular, and few very fine dendritic tubular pores; 55 percent discontinuous distinct strong brown (7.5YR 5/6) clay films on all faces of peds, on rock fragments, and on surfaces along root channels; 5 percent flat subrounded very strongly cemented 5- to 75-millimeter sandstone fragments, 5 percent flat subrounded very strongly cemented 2- to 5-millimeter sandstone fragments, 20 percent flat subrounded indurated 250- to 1000-millimeter sandstone fragments, and 20 percent flat subrounded indurated 75- to 250-millimeter sandstone fragments; very strongly acid, pH 5.0.

Range in Characteristics

Depth to restrictive feature: Greater than 203 centimeters
Diagnostic feature(s): Ochric epipedon and argillic horizon
Surface fragments: 3 to 15 percent subangular indurated sandstone, unspecified (shape or size unspecified); 1 to 3 percent subrounded indurated sandstone, unspecified stones
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
- Hue—10YR
- Value—3 or 4 moist
- Chroma—2 or 3 moist
- Texture—very bouldery loam, very bouldery fine sandy loam, flaggy fine sandy loam
- Fragment content—20 to 80 percent
- Reaction—pH 4.5 to 5.5
- Organic matter content—1.0 to 4.0 percent

BE or BA horizon(s) (where present):
- Hue—10YR
- Value—4 or 5 moist
- Chroma—3 or 4 moist
- Texture—very bouldery loam, very bouldery fine sandy loam, flaggy fine sandy loam
- Fragment content—20 to 80 percent
- Reaction—pH 4.5 to 5.5
- Organic matter content—1.0 to 4.0 percent

Bt horizon(s):
- Hue—5YR to 10YR
- Value—4 or 5 moist
- Chroma—4 to 6 moist
- Texture—very channery fine sandy loam, very cobbly loam, very channery loam, very flaggy loam, very bouldery loam, extremely channery loam, channery fine sandy loam, extremely channery fine sandy loam
- Fragment content—20 to 80 percent
- Reaction—pH 4.5 to 5.5
- Organic matter content—0.5 to 2.0 percent

BC horizon(s) (where present):
- Hue—7.5YR to 10YR
- Value—5 or 6 moist
- Chroma—3 to 6 moist
- Texture—extremely channery sandy clay loam, very stony loam, extremely

channery loam, extremely stony loam, stony clay loam, extremely channery clay loam, very bouldery sandy clay loam, very stony sandy clay loam, stony loam, very stony clay loam, very bouldery loam, stony sandy clay loam
Fragment content—40 to 75 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 0.5 percent

Gilpin Series

Major land resource area: 125
Map unit(s):
GaC—Gilpin loam, 5 to 12 percent slopes
GaD—Gilpin loam, 12 to 20 percent slopes
GbF—Gilpin-Bouldin complex, 20 to 75 percent slopes, very stony
GdF—Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony
GpE—Gilpin-Petros complex, 20 to 35 percent slopes
GpF—Gilpin-Petros complex, 35 to 75 percent slopes
GsB—Gilpin-Sequoia complex, 2 to 5 percent slopes
GsC—Gilpin-Sequoia complex, 5 to 12 percent slopes
GsD—Gilpin-Sequoia complex, 12 to 20 percent slopes
LgC—Lily-Gilpin complex, 5 to 12 percent slopes
LgD—Lily-Gilpin complex, 12 to 20 percent slopes
LgE—Lily-Gilpin complex, 20 to 35 percent slopes
Depth class: Moderately deep
Drainage class: Well drained
Saturated hydraulic conductivity (K_{sat}): Moderately high
Landform(s): Gorge on dissected plateau and ridge on dissected plateau
Landform position(s) (three-dimensional): Interfluve, nose slope, and side slope
Parent material: Fine-loamy residuum weathered from interbedded sedimentary rock
Elevation: 244 to 500 meters
Slope: 2 to 70 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Fine-loamy, mixed, active, mesic Typic Hapludults

Typical Pedon

Location in survey area: Gilpin loam, 5 to 12 percent slopes (fig. 12); in Big South Fork National River and Recreation Area, Scott County, Tennessee; USGS Honey Creek, Tennessee topographic quadrangle; latitude 36 degrees 23 minutes 41.50 seconds north and longitude 84 degrees 38 minutes 33.20 seconds west; UTM Zone 16, 711425 meters easting, 4030312 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 11 centimeters; brown (10YR 4/3) crushed silt loam; weak medium granular structure; very friable; common fine, common medium, and common coarse roots throughout; 2 percent flat angular 2- to 150-millimeter shale fragments and 3 percent flat angular 2- to 150-millimeter sandstone fragments; very strongly acid, pH 4.5; clear smooth boundary.
E—11 to 18 centimeters; yellowish brown (10YR 5/4) broken face silt loam; weak medium subangular blocky structure; friable; common fine, common very fine, common medium, common coarse, and common very coarse roots throughout; 4 percent flat angular 2- to 150-millimeter shale fragments and 6 percent flat angular

Figure 12.—Typical profile of Gilpin loam. Measurements are in centimeters.

2- to 150-millimeter sandstone fragments; very strongly acid, pH 4.5; gradual wavy boundary.

Bt1—18 to 38 centimeters; yellowish brown (10YR 5/6) broken face loam; moderate medium subangular blocky structure; friable; common fine, common medium, and common very fine roots; 35 percent discontinuous faint yellowish brown (10YR 5/4) clay films on all faces of peds; 2 percent flat angular 2- to 150-millimeter sandstone fragments and 8 percent flat angular 2- to 150-millimeter shale fragments; very strongly acid, pH 4.5; gradual wavy boundary.

Bt2—38 to 59 centimeters; yellowish brown (10YR 5/8) broken face clay loam; moderate coarse subangular blocky structure; friable; common fine and common medium roots throughout; 35 percent discontinuous faint yellowish brown (10YR 5/6) clay films on all faces of peds; 2 percent flat angular 2- to 150-millimeter sandstone fragments and 8 percent flat angular 2- to 150-millimeter shale fragments; very strongly acid, pH 4.5; gradual wavy boundary.

Bt3—59 to 84 centimeters; yellowish brown (10YR 5/8) broken face channery silty clay loam; 11 percent fine faint strong brown (7.5YR 5/6) mottles; strong coarse subangular blocky structure; friable; common fine roots throughout; 80 percent discontinuous distinct yellowish brown (10YR 5/6) clay films on all faces of peds; 5 percent flat angular 2- to 150-millimeter sandstone fragments and 15 percent flat angular 2- to 150-millimeter shale fragments; very strongly acid, pH 4.5; clear wavy boundary.
Cr—84 to 109 centimeters; moderately cemented sandstone and shale bedrock.

Range in Characteristics

Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Diagnostic feature(s): Ochric epipedon and argillic horizon
Surface fragments: 0 to 1 percent subrounded indurated sandstone, unspecified stones
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
Hue—10YR
Value—3 or 4 moist
Chroma—2 or 3 moist
Texture—loam, silt loam
Fragment content—5 to 15 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.5 to 4.0 percent

E or BE horizon(s) (where present):
Hue—7.5YR to 10YR
Value—4 or 6 moist
Chroma—3 or 5 moist
Texture—loam, silt loam
Fragment content—5 to 15 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.5 to 4.0 percent

Bt horizon(s):
Hue—7.5YR to 10YR
Value—4 to 6 moist
Chroma—4 to 6 moist
Texture—loam, silt loam, silty clay loam, clay loam, channery clay loam, channery silt loam, channery loam, channery silty clay loam
Fragment content—5 to 20 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.2 to 1.0 percent

BC horizon(s) (where present):
Hue—7.5YR to 10YR
Value—4 to 6 moist
Chroma—4 to 6 moist
Texture—channery clay loam, clay loam, loam, channery silty clay loam, channery loam, silty clay loam, channery silt loam, silt loam
Fragment content—5 to 34 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.0 to 0.5 percent

Cr horizon(s):
Texture—weathered acid shale and siltstone bedrock

Itmann Series

Major land resource area: 125
Map unit(s):
ItE—Itmann very parachannery loam, 4 to 55 percent slopes
Local phase(s): Unstable fill
Depth class: Very deep
Drainage class: Somewhat excessively drained
Saturated hydraulic conductivity (K_{sat}): High
Landform(s): Spoil pile on ridge on dissected plateau
Landform position(s) (three-dimensional): Base slope
Parent material: Coal extraction mine spoil derived from interbedded sedimentary rock
Elevation: 244 to 500 meters
Slope: 4 to 55 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Loamy-skeletal, mixed, semiactive, acid, mesic Typic Udorthents

Typical Pedon

Location in survey area: Itmann very parachannery loam, 4 to 55 percent slopes; in Big South Fork National River and Recreation Area, McCreary County, Kentucky; USGS Barthell, Kentucky topographic quadrangle; latitude 36 degrees 39 minutes 50.40 seconds north and longitude 84 degrees 31 minutes 47.10 seconds west; UTM Zone 16, 720776 meters easting, 4060443 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 10 centimeters; black (10YR 2/1) very parachannery loam, very dark gray (10YR 3/1) dry; weak fine granular structure; friable; common fine and common medium roots throughout; 5 percent flat 2- to 150-millimeter shale fragments, 5 percent flat 2- to 150-millimeter sandstone fragments, and 30 percent flat 2- to 150-millimeter coal fragments; very strongly acid, pH 4.5; abrupt wavy boundary.

C1—10 to 51 centimeters; very dark gray (10YR 3/1) very parachannery loam; massive; firm; common medium roots throughout; 5 percent flat 2- to 200-millimeter sandstone fragments, 10 percent flat 2- to 200-millimeter shale fragments, and 40 percent flat 2- to 200-millimeter coal fragments; extremely acid, pH 4.0; gradual wavy boundary.

C2—51 to 200 centimeters; very dark gray (10YR 3/1) extremely parachannery loam; massive; firm; 5 percent flat 2- to 150-millimeter sandstone fragments, 10 percent flat 2- to 150-millimeter shale fragments, and 50 percent flat 2- to 379-millimeter coal fragments; extremely acid, pH 4.0.

Range in Characteristics

Depth to restrictive feature: Greater than 203 centimeters
Diagnostic feature(s): Ochric epipedon
Surface fragments: None
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
Hue—neutral or 10YR
Value—2 to 3 moist
Chroma—1 or 2 moist
Texture—very parachannery loam
Fragment content—15 to 80 percent

Reaction—pH 2.5 to 5.5
Organic matter content—0.0 to 0.5 percent

C horizon(s):
Hue—neutral or 10YR
Value—2 to 3 moist
Chroma—1 or 2 moist
Texture—very parachannery loam, extremely parachannery clay loam, very channery loam
Fragment content—15 to 80 percent
Reaction—pH 2.5 to 5.5
Organic matter content—0.0 to 0.1 percent

Lily Series

Major land resource area: 125
Map unit(s):
AyD—Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded
LdB—Lily loam, 2 to 5 percent slopes
LdC—Lily loam, 5 to 12 percent slopes
LdD—Lily loam, 12 to 20 percent slopes
LgC—Lily-Gilpin complex, 5 to 12 percent slopes
LgD—Lily-Gilpin complex, 12 to 20 percent slopes
LgE—Lily-Gilpin complex, 20 to 35 percent slopes
LmC—Lily-Ramsey complex, 5 to 12 percent slopes
LmD—Lily-Ramsey complex, 12 to 20 percent slopes
LmE—Lily-Ramsey complex, 20 to 35 percent slopes
Depth class: Moderately deep
Drainage class: Well drained
Saturated hydraulic conductivity (K_{sat}): High
Landform(s): Ridge on dissected plateau
Landform position(s) (three-dimensional): Interfluve and side slope
Parent material: Fine-loamy residuum weathered from sandstone
Elevation: 244 to 500 meters
Slope: 2 to 35 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

Typical Pedon

Location in survey area: Lily fine sandy loam in an area of Lily-Ramsey complex, 12 to 20 percent slopes; in Big South Fork National River and Recreation Area, Pickett County, Tennessee; USGS Sharp Place, Tennessee topographic quadrangle; latitude 36 degrees 33 minutes 19.60 seconds north and longitude 84 degrees 46 minutes 10.60 seconds west; UTM Zone 16, 699615 meters easting, 4047873 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 8 centimeters; dark brown (10YR 3/3) crushed fine sandy loam; weak medium granular structure; very friable; common fine, common very fine, and common medium roots throughout; very strongly acid, pH 4.5; clear smooth boundary.
BE—8 to 26 centimeters; yellowish brown (10YR 5/4) broken face fine sandy loam; 1 percent medium faint brown (10YR 4/3) mottles; weak medium subangular blocky structure; very friable; common fine, common very fine, and common medium

roots throughout; 10 percent nonflat subangular 2- to 76-millimeter sandstone fragments; very strongly acid, pH 4.5; gradual smooth boundary.

Bt1—26 to 46 centimeters; yellowish brown (10YR 5/6) broken face fine sandy loam; weak medium subangular blocky structure; friable; common fine, common very fine, and common medium roots throughout; 15 percent faint yellowish brown (10YR 5/4) clay films on all faces of peds; 10 percent nonflat subangular 2- to 76-millimeter sandstone fragments; very strongly acid, pH 4.5; gradual smooth boundary.

Bt2—46 to 69 centimeters; yellowish brown (10YR 5/8) broken face sandy clay loam; moderate coarse subangular blocky structure; friable; common fine, common very fine, and common medium roots throughout; 38 percent discontinuous distinct yellowish brown (10YR 5/6) clay films on all faces of peds; 10 percent nonflat subangular 2- to 76-millimeter sandstone fragments; very strongly acid, pH 4.5; gradual smooth boundary.

R—69 to 79 centimeters; indurated sandstone bedrock.

Range in Characteristics

Depth to restrictive feature: 51 to 102 centimeters to lithic bedrock
Diagnostic feature(s): Ochric epipedon, lithic contact, and argillic horizon
Surface fragments: None
Seasonal high water table: Greater than 183 centimeters

A or Ap horizon(s):
Hue—10YR or 2.5Y
Value—4 to 6 moist
Chroma—2 to 4 moist
Texture—fine sandy loam, loam
Fragment content—0 to 30 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.5 to 4.0 percent

BE horizon(s):
Hue—10YR or 2.5Y
Value—4 to 6 moist
Chroma—2 to 4 moist
Texture—loam, fine sandy loam
Fragment content—0 to 30 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.5 to 4.0 percent

Bt horizon(s):
Hue—7.5YR to 2.5Y
Value—4 to 6 moist
Chroma—4 to 8 moist
Texture—loam, clay loam, fine sandy loam
Fragment content—0 to 30 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.0 to 0.5 percent

BC or C horizon(s) (where present):
Hue—5YR to 2.5Y
Value—4 to 6 moist
Chroma—4 to 8 moist
Texture—loam, clay loam, sandy clay loam
Fragment content—0 to 35 percent

Reaction—pH 3.6 to 5.5
Organic matter content—0.1 to 0.5 percent

R horizon(s):
Texture—unweathered sandstone bedrock

Lonewood Series

Major land resource area: 125
Map unit(s):
LoB—Lonewood silt loam, 2 to 5 percent slopes
LoC—Lonewood silt loam, 5 to 12 percent slopes
Depth class: Deep and very deep
Drainage class: Well drained
Saturated hydraulic conductivity (K_{sat}): Moderately high
Landform(s): Interfluve on dissected plateau
Landform position(s) (three-dimensional): Interfluve
Parent material: Fine-loamy residuum weathered from sandstone
Elevation: 244 to 500 meters
Slope: 2 to 12 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

Typical Pedon

Location in survey area: Lonewood silt loam, 2 to 5 percent slopes; in Morgan County, Tennessee; USGS Camp Austin, Tennessee topographic quadrangle; latitude 36 degrees 4 minutes 14.00 seconds north and longitude 84 degrees 37 minutes 13.00 seconds west; UTM Zone 16, 714302 meters easting, 3994409 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 5 centimeters; brown (10YR 4/3) broken face silt loam; weak medium granular structure; very friable; common fine and common medium roots throughout; very strongly acid, pH 5.0; abrupt smooth boundary.

BE—5 to 15 centimeters; yellowish brown (10YR 5/4) broken face silt loam; weak fine subangular blocky structure; very friable; common fine and common medium roots throughout; very strongly acid, pH 5.0; clear smooth boundary.

Bt1—15 to 56 centimeters; yellowish brown (10YR 5/6) broken face silt loam; moderate medium subangular blocky structure; friable; common fine, common medium, and common coarse roots throughout; 10 percent discontinuous faint yellowish brown (10YR 5/4) clay films on surfaces along root channels; very strongly acid, pH 5.0; gradual smooth boundary.

Bt2—56 to 76 centimeters; strong brown (7.5YR 5/6) broken face silty clay loam; 10 percent medium faint spherical yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine and common medium roots throughout; 10 percent discontinuous faint brown (7.5YR 5/4) clay films on surfaces along root channels; 5 percent flat subangular very strongly cemented 2- to 76-millimeter sandstone fragments; very strongly acid, pH 5.0; gradual smooth boundary.

2Bt3—76 to 124 centimeters; yellowish red (5YR 5/8) broken face clay loam; 10 percent medium distinct spherical brownish yellow (10YR 6/8) and 10 percent medium faint spherical strong brown (7.5YR 5/6) mottles; friable; common fine and common medium roots throughout; 40 percent discontinuous distinct

yellowish red (5YR 5/6) clay films on all faces of peds and 40 percent discontinuous distinct yellowish red (5YR 5/6) clay films on surfaces along root channels; 5 percent flat subangular very strongly cemented 2- to 76-millimeter sandstone fragments; very strongly acid, pH 5.0; gradual smooth boundary.

2BC—124 to 150 centimeters; yellowish red (5YR 5/8) broken face loam; 10 percent medium distinct spherical yellowish brown (10YR 5/6) and 10 percent medium faint spherical strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; 10 percent flat subangular very strongly cemented 2- to 76-millimeter sandstone fragments; very strongly acid, pH 5.0; abrupt smooth boundary.

Cr—150 to 175 centimeters; weathered bedrock.

Range in Characteristics

Depth to restrictive feature: 102 to 183 centimeters to paralithic bedrock
Diagnostic feature(s): Ochric epipedon and argillic horizon
Surface fragments: None
Seasonal high water table: Greater than 183 centimeters

A or Ap horizon(s):
Hue—10YR
Value—3 to 5 moist
Chroma—2 to 4 moist
Texture—silt loam, loam
Fragment content—0 to 5 percent
Reaction—pH 4.5 to 5.5
Organic matter content—1.0 to 3.0 percent

BE or E horizon(s) (where present):
Hue—7.5YR to 10YR
Value—5 moist
Chroma—4 to 8 moist
Texture—silt loam, loam
Fragment content—0 to 5 percent
Reaction—pH 4.5 to 5.5
Organic matter content—1.0 to 3.0 percent

Bt horizon(s):
Hue—5YR to 10YR
Value—5 moist
Chroma—4 to 8 moist
Texture—silt loam, loam, silty clay loam, clay loam
Fragment content—0 to 5 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 0.5 percent

2Bt horizon(s):
Hue—2.5YR to 7.5YR
Value—4 or 5 moist
Chroma—6 to 8 moist
Texture—silty clay loam, clay loam
Fragment content—0 to 5 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 0.5 percent

2BC horizon(s):
Hue—2.5YR to 7.5YR
Value—4 or 5 moist

Chroma—6 to 8 moist
Texture—clay loam, silty clay loam
Fragment content—0 to 10 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 0.5 percent

Cr horizon(s):
Texture—weathered sandstone bedrock

Petros Series

Major land resource area: 125
Map unit(s):
GdF—Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony
GpE—Gilpin-Petros complex, 20 to 35 percent slopes
GpF—Gilpin-Petros complex, 35 to 75 percent slopes
Depth class: Shallow
Drainage class: Excessively drained
Saturated hydraulic conductivity (K_{sat}): High
Landform(s): Gorge on plateau, ridge on plateau, gorge on dissected plateau, and ridge on dissected plateau
Landform position(s) (three-dimensional): Nose slope
Parent material: Loamy-skeletal residuum weathered from shale and siltstone
Elevation: 244 to 500 meters
Slope: 20 to 80 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts

Typical Pedon

Location in survey area: Petros channery silt loam in an area of Gilpin-Bouldin-Petros complex, 25 to 75 percent slopes, very stony; in Scott County, Tennessee; USGS Norma, Tennessee topographic quadrangle; latitude 36 degrees 15 minutes 19.00 seconds north and longitude 84 degrees 29 minutes 3.00 seconds west; UTM Zone 16, 726035 meters easting, 4015199 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 5 centimeters; dark grayish brown (10YR 4/2) broken face channery silt loam; weak fine granular structure; very friable; many fine and many medium roots throughout; 20 percent flat angular strongly cemented 2- to 150-millimeter shale fragments; strongly acid, pH 5.5; abrupt smooth boundary.
Bw1—5 to 20 centimeters; yellowish brown (10YR 5/6) broken face very channery silt loam; weak fine subangular blocky structure; friable; common fine and common medium roots throughout; 50 percent flat angular strongly cemented 2- to 150-millimeter shale fragments; very strongly acid, pH 4.5; gradual smooth boundary.
Bw2—20 to 41 centimeters; yellowish brown (10YR 5/6) broken face extremely channery silt loam; weak fine subangular blocky structure; friable; common fine, common medium, and few coarse roots throughout; 75 percent flat angular strongly cemented 2- to 150-millimeter shale fragments; very strongly acid, pH 4.5; abrupt smooth boundary.
Cr—41 to 66 centimeters; weathered bedrock.

Range in Characteristics

Depth to restrictive feature: 25 to 51 centimeters to paralithic bedrock
Diagnostic feature(s): Ochric epipedon and cambic horizon
Surface fragments: 0 to 1 percent subrounded indurated sandstone, unspecified stones
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
Hue—10YR
Value—3 or 4 moist
Chroma—2 or 3 moist
Texture—channery loam, channery silt loam
Fragment content—0 to 35 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.5 to 2.0 percent

Bw horizon(s):
Hue—7.5YR to 10YR
Value—4 to 6 moist
Chroma—4 to 6 moist
Texture—very channery silty clay loam, extremely channery silty clay loam, extremely channery silt loam, very channery silt loam
Fragment content—25 to 80 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 1.2 percent

Cr horizon(s):
Texture—weathered acid shale and siltstone bedrock

Pope Series

Major land resource area: 125
Map unit(s):
Ps—Pope-Skidmore complex, 0 to 4 percent slopes, frequently flooded
Depth class: Very deep
Drainage class: Well drained
Saturated hydraulic conductivity (K_{sat}): Moderately high
Landform(s): Flood plain on dissected plateau
Parent material: Coarse-loamy alluvium derived from sandstone and shale
Elevation: 213 to 305 meters
Slope: 0 to 4 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts

Typical Pedon

Location in survey area: Pope fine sandy loam in an area of Pope-Skidmore complex, 0 to 4 percent slopes, frequently flooded; in Big South Fork National River and Recreation Area, Scott County, Tennessee; USGS Barthell SW, Tennessee topographic quadrangle; latitude 36 degrees 34 minutes 48.90 seconds north and longitude 84 degrees 38 minutes 37.80 seconds west; UTM Zone 16, 710807 meters easting, 4050894 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 8 centimeters; brown (10YR 4/3) interior fine sandy loam; 1 percent fine faint spherical very dark grayish brown (10YR 3/2) mottles; weak medium granular structure; very friable; common fine and common very fine roots throughout; strongly acid, pH 5.5; clear smooth boundary.
Bw1—8 to 31 centimeters; dark yellowish brown (10YR 4/4) interior sandy loam; weak medium subangular blocky structure; friable; common fine roots; strongly acid, pH 5.5; clear smooth boundary.
Bw2—31 to 58 centimeters; dark yellowish brown (10YR 4/6) interior loamy sand; 10 percent fine distinct spherical light yellowish brown (2.5Y 6/4) and 10 percent medium distinct spherical yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; very friable; common fine, common medium, and common very fine roots throughout; strongly acid, pH 5.5; clear smooth boundary.
Bw3—58 to 94 centimeters; dark yellowish brown (10YR 4/4) interior sandy loam; 10 percent medium distinct spherical light yellowish brown (2.5Y 6/4) mottles; weak coarse subangular blocky structure; very friable; common fine and common very fine roots throughout; strongly acid, pH 5.5; gradual wavy boundary.
Bw4—94 to 135 centimeters; dark yellowish brown (10YR 3/4) interior fine sandy loam; 10 percent medium distinct spherical dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; common very fine roots throughout; moderately acid, pH 6.0; gradual wavy boundary.
Bw5—135 to 152 centimeters; dark yellowish brown (10YR 4/4) interior fine sandy loam; 10 percent medium distinct spherical dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; common very fine roots throughout; strongly acid, pH 5.5; gradual wavy boundary.
Bw6—152 to 188 centimeters; yellowish brown (10YR 5/6) interior fine sandy loam; 10 percent medium distinct spherical dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; friable; common very fine roots throughout; very strongly acid, pH 5.0.

Range in Characteristics

Depth to restrictive feature: Greater than 203 centimeters
Diagnostic feature(s): Ochric epipedon and cambic horizon
Surface fragments: None
Seasonal high water table: January, February, March, April, May, November, and December
Depth to top of water table: 152 to 183 centimeters

A horizon(s):
Hue—10YR
Value—3 to 5 moist
Chroma—2 to 4 moist
Texture—sand, loamy sand, sandy loam, fine sandy loam
Fragment content—0 to 30 percent
Reaction—pH 3.6 to 5.5
Organic matter content—1.0 to 4.0 percent

Bw horizon(s):
Hue—7.5YR to 10YR
Value—3 to 5 moist
Chroma—3 to 6 moist
Texture—fine sandy loam, sandy loam, loamy sand, sand, gravelly fine sandy loam, sandy loam, very gravelly sandy loam, fine sandy loam, very gravelly fine sandy loam, gravelly sandy loam
Fragment content—0 to 30 percent

Reaction—pH 3.6 to 5.5
Organic matter content—0.0 to 0.5 percent

C horizon(s) (where present):
Hue—10YR to 2.5Y
Value—4 to 6 moist
Chroma—2 to 6 moist
Texture—gravelly fine sandy loam, sandy loam, very gravelly sandy loam, fine sandy loam, very gravelly fine sandy loam, gravelly sandy loam, fine sandy loam, sandy loam, loamy sand
Fragment content—0 to 30 percent
Reaction—pH 3.6 to 5.5
Organic matter content—0.0 to 0.5 percent

Ramsey Series

Major land resource area: 125
Map unit(s):
LmC—Lily-Ramsey complex, 5 to 12 percent slopes
LmD—Lily-Ramsey complex, 12 to 20 percent slopes
LmE—Lily-Ramsey complex, 20 to 35 percent slopes
RaF—Rock outcrop-Ramsey complex, 20 to 70 percent slopes
Depth class: Very shallow and shallow
Drainage class: Somewhat excessively drained
Saturated hydraulic conductivity (K_{sat}): High
Landform(s): Gorge on dissected plateau and ridge on dissected plateau
Landform position(s) (three-dimensional): Interfluve, nose slope, side slope, and free face
Parent material: Loamy residuum weathered from sandstone
Elevation: 244 to 759 meters
Slope: 5 to 70 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Loamy, siliceous, subactive, mesic Lithic Dystrudepts (fig. 13)

Typical Pedon

Location in survey area: Ramsey loam in an area of Lily-Ramsey complex, 5 to 12 percent slopes; in Scott State Forest, Scott County, Tennessee; USGS Honey Creek, Tennessee topographic quadrangle; latitude 36 degrees 28 minutes 45.00 seconds north and longitude 84 degrees 40 minutes 54.00 seconds west; UTM Zone 16, 707691 meters easting, 4039596 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 5 centimeters; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; many fine and many medium roots throughout; 3 percent nonflat subangular 2- to 50-millimeter sandstone fragments; strongly acid, pH 5.3; clear smooth boundary.
BA—5 to 10 centimeters; brown (10YR 4/3) loam; weak fine subangular blocky structure; very friable; common fine and common medium roots throughout; 3 percent nonflat subangular 2- to 50-millimeter sandstone fragments; strongly acid, pH 5.3; clear smooth boundary.
Bw1—10 to 25 centimeters; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and common

Figure 13.—A profile of Ramsey loamy fine sand. Measurements are in centimeters.

medium roots throughout; 5 percent flat subangular 2- to 80-millimeter sandstone fragments; strongly acid, pH 5.3; gradual smooth boundary.

Bw2—25 to 41 centimeters; yellowish brown (10YR 5/6) channery sandy loam; weak fine subangular blocky structure; very friable; common fine and common medium roots throughout; 15 percent flat subangular 2- to 80-millimeter sandstone fragments; strongly acid, pH 5.3; abrupt smooth boundary.

R—41 to 66 centimeters; bedrock.

Range in Characteristics

Depth to restrictive feature: 18 to 51 centimeters to lithic bedrock
Diagnostic feature(s): Ochric epipedon and cambic horizon
Surface fragments: None
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
- Hue—10YR
- Value—3 to 5 moist
- Chroma—2 to 4 moist
- Texture—loam
- Fragment content—5 to 35 percent
- Reaction—pH 4.5 to 6.0
- Organic matter content—0.5 to 2.0 percent

BA horizon(s) (where present):
- Hue—7.5YR or 10YR
- Value—3 to 5 moist
- Chroma—2 to 4 moist

Texture—sandy loam, fine sandy loam, channery loam, channery sandy loam, channery fine sandy loam
Fragment content—5 to 35 percent
Reaction—pH 4.5 to 6.0
Organic matter content—0.0 to 0.5 percent

E horizon(s) (where present):
Hue—10YR
Value—3 to 5 moist
Chroma—2 to 4 moist
Texture—sandy loam, fine sandy loam, channery loam, loam, channery sandy loam, channery fine sandy loam
Fragment content—5 to 35 percent
Reaction—pH 4.5 to 6.0
Organic matter content—0.0 to 0.5 percent

Bw horizon(s):
Hue—7.5YR to 10YR
Value—4 to 6 moist
Chroma—4 to 6 moist
Texture—channery sandy loam, channery loam, channery fine sandy loam, fine sandy loam, sandy loam, loam
Fragment content—3 to 35 percent
Reaction—pH 4.5 to 6.0
Organic matter content—0.0 to 0.5 percent

R horizon(s):
Texture—unweathered sandstone bedrock

Sequoia Series

Major land resource area: 125
Map unit(s):
GsB—Gilpin-Sequoia complex, 2 to 5 percent slopes
GsC—Gilpin-Sequoia complex, 5 to 12 percent slopes
GsD—Gilpin-Sequoia complex, 12 to 20 percent slopes
Depth class: Moderately deep
Drainage class: Well drained
Saturated hydraulic conductivity (K_{sat}): Moderately high
Landform(s): Ridge on dissected plateau
Landform position(s) (three-dimensional): Interfluve and side slope
Parent material: Clayey residuum weathered from acid shale
Elevation: 244 to 500 meters
Slope: 2 to 20 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Fine, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Location in survey area: Sequoia silt loam in an area of Gilpin-Sequoia complex, 12 to 20 percent slopes; in Big South Fork National River and Recreation Area, McCreary County, Kentucky; Bear Creek area; USGS Barthell, Kentucky topographic quadrangle; latitude 36 degrees 37 minutes 36.00 seconds north and longitude 84

degrees 31 minutes 30.00 seconds west; UTM Zone 16, 721308 meters easting, 4056311 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 13 centimeters; dark yellowish brown (10YR 4/4) broken face silt loam, yellowish brown (10YR 5/4) broken face dry; weak fine granular structure; very friable; many fine roots throughout; strongly acid, pH 5.5; abrupt smooth boundary.

Bt1—13 to 30 centimeters; strong brown (7.5YR 5/6) broken face silty clay loam; moderate medium subangular blocky structure; friable; common fine and common medium roots throughout; 10 percent discontinuous distinct clay films on all faces of peds; very strongly acid, pH 4.5; clear smooth boundary.

Bt2—30 to 50 centimeters; yellowish red (5YR 5/6) broken face silty clay; moderate medium subangular blocky structure; firm; common fine roots throughout; 30 percent discontinuous distinct clay films on all faces of peds; 2 percent flat subangular strongly cemented 2- to 75-millimeter shale fragments; very strongly acid, pH 4.5; gradual wavy boundary.

Bt3—50 to 86 centimeters; 85 percent yellowish red (5YR 5/6) broken face and 15 percent yellow (10YR 7/8) broken face clay; moderate medium angular blocky structure; firm; 40 percent discontinuous distinct clay films on all faces of peds; 5 percent flat subangular strongly cemented 2- to 75-millimeter shale fragments and 5 percent flat subangular strongly cemented 2- to 75-millimeter siltstone fragments; very strongly acid, pH 4.5; gradual smooth boundary.

Cr—86 to 111 centimeters; yellowish red (5YR 5/6) and yellow (10YR 7/8) bedrock.

Range in Characteristics

Depth to restrictive feature: 51 to 102 centimeters to paralithic bedrock
Diagnostic feature(s): Ochric epipedon and argillic horizon
Surface fragments: None
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
- Hue—10YR
- Value—3 to 5 moist
- Chroma—2 to 6 moist
- Texture—silt loam
- Fragment content—0 to 12 percent
- Reaction—pH 4.5 to 6.8
- Organic matter content—0.5 to 2.0 percent

BE horizon(s) (where present):
- Hue—7.5YR to 10YR
- Value—4 to 6 moist
- Chroma—4 to 8 moist
- Texture—silt loam or silty clay loam
- Fragment content—0 to 12 percent
- Reaction—pH 4.5 to 6.8
- Organic matter content—0.5 to 2.0 percent

Bt horizon(s):
- Hue—5YR to 10YR
- Value—4 or 5 moist
- Chroma—4 to 8 moist
- Texture—silty clay loam, silty clay, channery silty clay
- Fragment content—0 to 14 percent
- Reaction—pH 4.5 to 5.5
- Organic matter content—0.0 to 0.5 percent

Cr horizon(s):
Texture—weathered acid shale and siltstone bedrock

Shelocta Series

Major land resource area: 125
Map unit(s):
SaC—Shelocta silt loam, 5 to 12 percent slopes
SaD—Shelocta silt loam, 12 to 20 percent slopes
SaE—Shelocta silt loam, 20 to 35 percent slopes
SbF—Shelocta-Bouldin complex, 30 to 75 percent slopes, extremely stony, very rocky
Depth class: Very deep
Drainage class: Well drained
Saturated hydraulic conductivity (K_{sat}): Moderately high
Landform(s): Hillslope on dissected plateau and hillslope on gorge on dissected plateau
Landform position(s) (three-dimensional): Base slope
Parent material: Fine-loamy colluvium derived from interbedded sedimentary rock
Elevation: 244 to 500 meters
Slope: 5 to 75 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Fine-loamy, mixed, active, mesic Typic Hapludults

Typical Pedon

Location in survey area: Shelocta loam in an area of Shelocta-Bouldin complex, 30 to 75 percent slopes, extremely stony, very rocky; in Big South Fork National River and Recreation Area, McCreary County, Kentucky; USGS Barthell, Kentucky topographic quadrangle; latitude 36 degrees 43 minutes 4.20 seconds north and longitude 84 degrees 32 minutes 43.50 seconds west; UTM Zone 16, 719223 meters easting, 4066380 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 8 centimeters; dark brown (10YR 3/3) exterior loam, brown (10YR 4/3) exterior dry; weak medium granular structure; friable; many fine and common medium roots throughout; 5 percent flat subangular indurated 2- to 76-millimeter sandstone fragments; strongly acid, pH 5.5; clear wavy boundary.

BA—8 to 23 centimeters; yellowish brown (10YR 5/6) exterior silt loam; weak fine subangular blocky and weak medium subangular blocky structure; friable; many fine and common medium roots throughout; 2 percent flat subangular indurated 2- to 76-millimeter siltstone fragments and 3 percent flat subangular indurated 2- to 76-millimeter sandstone fragments; strongly acid, pH 5.5; gradual smooth boundary.

Bt1—23 to 53 centimeters; strong brown (7.5YR 5/6) exterior silty clay loam; moderate medium subangular blocky structure; firm; common fine and common medium roots throughout; 5 percent patchy distinct clay films on all faces of peds; 5 percent flat subangular indurated 2- to 76-millimeter siltstone fragments and 5 percent flat subangular indurated 2- to 76-millimeter sandstone fragments; very strongly acid, pH 5.0; gradual wavy boundary.

Bt2—53 to 81 centimeters; strong brown (7.5YR 5/6) exterior channery silty clay loam; moderate medium subangular blocky structure; firm; common medium roots

throughout; 20 percent discontinuous distinct clay films on all faces of peds; 5 percent flat subangular very strongly cemented 2- to 76-millimeter siltstone fragments and 10 percent flat subangular indurated 2- to 76-millimeter sandstone fragments; very strongly acid, pH 5.0; gradual wavy boundary.

Bt3—81 to 140 centimeters; yellowish brown (10YR 5/6) exterior channery silty clay loam; moderate medium subangular blocky structure; very firm; common medium roots throughout; 20 percent discontinuous distinct clay films on all faces of peds; 5 percent flat subangular indurated 2- to 76-millimeter siltstone fragments and 10 percent flat subangular indurated 2- to 76-millimeter sandstone fragments; very strongly acid, pH 5.0; gradual wavy boundary.

C—140 to 193 centimeters; yellowish brown (10YR 5/6) exterior channery silt loam; massive; very firm; 10 percent flat subangular indurated 2- to 76-millimeter sandstone fragments and 15 percent flat subangular indurated 2- to 76-millimeter siltstone fragments; very strongly acid, pH 4.5.

Range in Characteristics

Depth to restrictive feature: 122 to 216 centimeters to lithic bedrock
Diagnostic feature(s): Ochric epipedon and argillic horizon
Surface fragments: 3 to 15 percent subangular sandstone, unspecified (shape or size unspecified)
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
Hue—10YR
Value—3 or 4 moist
Chroma—2 or 3 moist
Texture—loam
Fragment content—2 to 35 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.5 to 5.0 percent

BA horizon(s) (where present):
Hue—7.5YR to 10YR
Value—4 to 6 moist
Chroma—4 to 8 moist
Texture—loam
Fragment content—2 to 35 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.5 to 5.0 percent

Bt horizon(s):
Hue—7.5YR to 10YR
Value—4 to 6 moist
Chroma—4 to 8 moist
Texture—very channery silt loam, silt loam, very channery silty clay loam, channery silty clay loam, channery silt loam
Fragment content—5 to 50 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.5 to 2.0 percent

C or BC horizon(s) (where present):
Hue—7.5YR to 10YR
Value—4 to 6 moist
Chroma—4 to 8 moist
Texture—extremely channery clay loam, channery silt loam, channery loam, very

channery silty clay loam, extremely channery silty clay loam, channery silty clay loam, very channery silt loam, extremely channery loam, channery clay loam, very channery clay loam, very channery loam, extremely channery silt loam
Fragment content—15 to 70 percent
Reaction—pH 4.5 to 5.5
Organic matter content—0.0 to 0.5 percent

Skidmore Series

Major land resource area: 125
Map unit(s):
Az—Atkins-Skidmore complex, frequently flooded
Ps—Pope-Skidmore complex, 0 to 4 percent slopes, frequently flooded
Sk—Skidmore very gravelly sandy loam, 0 to 10 percent slopes, frequently flooded
Depth class: Very deep
Drainage class: Well drained and somewhat excessively drained
Saturated hydraulic conductivity (K_{sat}): High
Landform(s): Flood plain on dissected plateau and gravelly and narrow flood plain on dissected plateau
Parent material: Loamy-skeletal alluvium derived from interbedded sedimentary rock
Elevation: 213 to 305 meters
Slope: 0 to 10 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Loamy-skeletal, mixed, semiactive, mesic Dystric Fluventic Eutrudepts

Typical Pedon

Location in survey area: Skidmore channery fine sandy loam in an area of Pope-Skidmore complex, 0 to 4 percent slopes, frequently flooded (fig. 14); in Big South Fork National River and Recreation Area, Scott County, Tennessee; USGS Barthell SW, Tennessee topographic quadrangle; latitude 36 degrees 32 minutes 1.50 seconds north and longitude 84 degrees 43 minutes 56.80 seconds west; UTM Zone 16, 702999 meters easting, 4045544 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 8 centimeters; brown (10YR 4/3) interior channery fine sandy loam; weak medium granular structure; very friable; many fine, many very fine, common medium, and common coarse roots throughout; 30 percent flat angular indurated 2- to 150-millimeter shale fragments; strongly acid, pH 5.5; gradual smooth boundary.
BA—8 to 28 centimeters; yellowish brown (10YR 5/4) interior very channery sandy loam; weak medium subangular blocky structure parting to moderate medium granular; very friable; many fine, many very fine, common medium, and common coarse roots throughout; common medium high-continuity tubular pores; 10 percent nonflat subangular indurated 2- to 76-millimeter sandstone fragments and 40 percent flat angular indurated 2- to 150-millimeter shale fragments; strongly acid, pH 5.5; gradual smooth boundary.
Bw—28 to 79 centimeters; dark yellowish brown (10YR 4/4) interior extremely

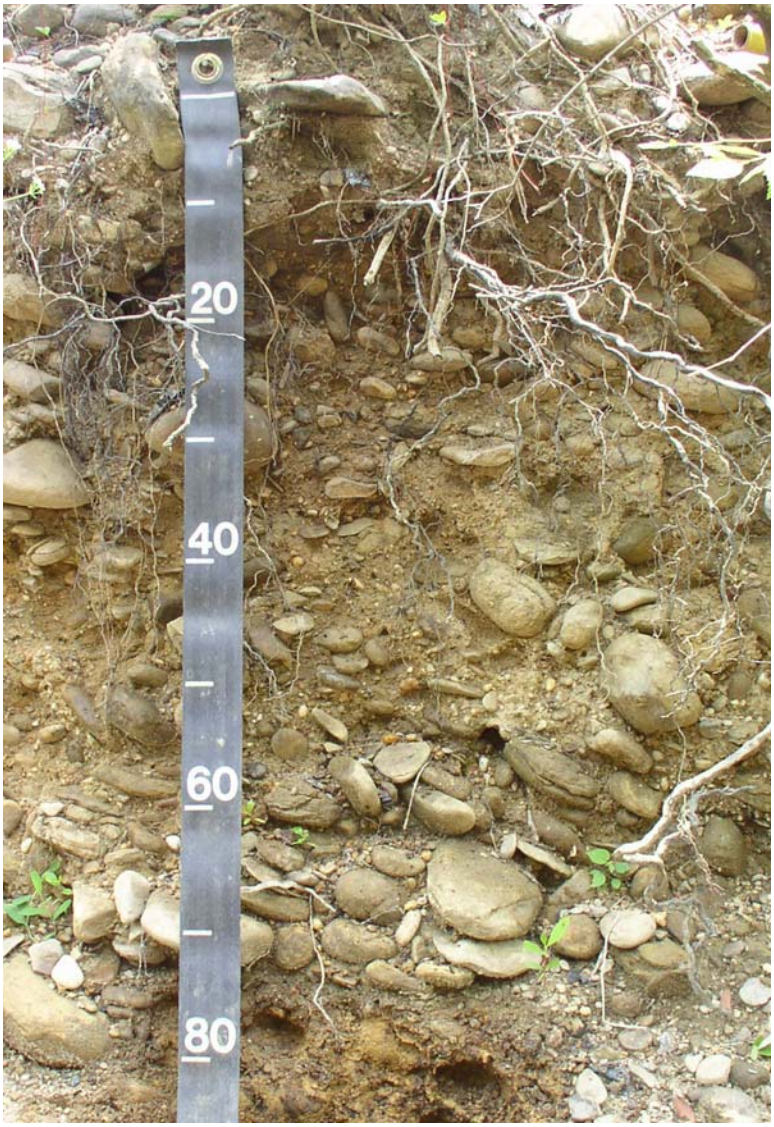

Figure 14.—A profile of Skidmore channery fine sandy loam. Measurements are in centimeters.

channery sandy loam; moderate fine subangular blocky structure; very friable; common fine and common very fine roots throughout; 20 percent nonflat subangular indurated 2- to 76-millimeter sandstone fragments and 50 percent flat angular indurated 2- to 150-millimeter shale fragments; strongly acid, pH 5.5; clear wavy boundary.

C1—79 to 86 centimeters; brown (10YR 4/3) interior extremely channery sandy loam; 11 percent medium distinct yellowish brown (10YR 5/4) mottles; massive; very friable; common fine and common very fine roots throughout; 20 percent nonflat subangular indurated 2- to 76-millimeter sandstone fragments and 50 percent flat angular indurated 2- to 150-millimeter shale fragments; very strongly acid, pH 5.0; clear wavy boundary.

C2—86 to 140 centimeters; dark yellowish brown (10YR 4/6) interior very channery loamy sand; single grain; very friable; common fine roots throughout; 5 percent

nonflat subangular indurated 2- to 76-millimeter sandstone fragments and 50 percent flat angular indurated 2- to 150-millimeter shale fragments; moderately acid, pH 6.0; gradual wavy boundary.

C3—140 to 156 centimeters; dark yellowish brown (10YR 4/6) interior very channery loamy sand; massive; very friable; common fine roots throughout; 11 percent medium distinct gray (10YR 5/1) iron depletions throughout; 5 percent nonflat subangular indurated 2- to 76-millimeter sandstone fragments and 50 percent flat angular indurated 2- to 150-millimeter shale fragments; moderately acid, pH 6.0.

Range in Characteristics

Depth to restrictive feature: Greater than 203 centimeters
Diagnostic feature(s): Ochric epipedon and cambic horizon
Surface fragments: None
Seasonal high water table: January, February, March, April, May, and December
Depth to top of water table: 122 to 152 centimeters

A horizon(s):
- Hue—10YR or 2.5Y
- Value—4 to 6 moist
- Chroma—2 to 6 moist
- Texture—channery fine sandy loam, very gravelly loam, very gravelly sandy loam, gravelly fine sandy loam, cobbly fine sandy loam
- Fragment content—17 to 80 percent
- Reaction—pH 4.5 to 7.8
- Organic matter content—0.5 to 3.0 percent

BA horizon(s):
- Hue—7.5YR to 2.5Y
- Value—4 to 6 moist
- Chroma—3 to 6 moist
- Texture—very channery sandy loam, gravelly sandy loam, very cobbly sandy loam, cobbly loam, very gravelly loam, very gravelly sandy loam, gravelly fine sandy loam
- Fragment content—35 to 80 percent
- Reaction—pH 4.5 to 7.8
- Organic matter content—0.0 to 0.5 percent

Bw horizon(s):
- Hue—7.5YR to 2.5Y
- Value—4 to 6 moist
- Chroma—3 to 6 moist
- Texture—extremely cobbly loamy sand, very cobbly sandy loam, very gravelly sandy loam
- Fragment content—35 to 85 percent
- Reaction—pH 4.5 to 5.5
- Organic matter content—0.0 to 0.5 percent

C or BC horizon(s) (where present):
- Hue—7.5YR to 2.5Y
- Value—4 to 6 moist
- Chroma—3 to 6 moist
- Texture—cobbly loam, very cobbly sandy loam, gravelly sandy loam, very channery loamy sand
- Reaction—pH 4.5 to 5.5
- Organic matter content—0.0 to 0.5 percent

Wernock Series

Major land resource area: 125
Map unit(s):
WnB—Wernock silt loam, 2 to 5 percent slopes
WnC—Wernock silt loam, 5 to 12 percent slopes
Depth class: Moderately deep
Drainage class: Well drained
Saturated hydraulic conductivity (K_{sat}): Moderately high
Landform(s): Interfluve on dissected plateau
Landform position(s) (three-dimensional): Interfluve
Parent material: Fine-silty residuum weathered from sandstone and siltstone
Elevation: 244 to 500 meters
Slope: 2 to 12 percent
Climatic data:
Mean annual precipitation: 1,211 to 1,542 millimeters
Mean annual air temperature: 4.8 to 19.2 degrees C
Frost-free period: 139 to 187 days
Taxonomic class: Fine-silty, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Location in survey area: Wernock silt loam, 2 to 5 percent slopes; in Scott County, Tennessee; USGS Robbins, Tennessee topographic quadrangle; latitude 36 degrees 18 minutes 52.00 seconds north and longitude 84 degrees 32 minutes 59.00 seconds west; UTM Zone 16, 719978 meters easting, 4021612 meters northing; NAD83. (Colors are for moist soil unless otherwise noted.)

A—0 to 5 centimeters; dark grayish brown (10YR 4/2) crushed silt loam; weak fine granular structure; very friable; many fine roots at top of horizon and common medium roots throughout; very strongly acid, pH 4.7; abrupt smooth boundary.
BE—5 to 31 centimeters; yellowish brown (10YR 5/6) broken face silt loam; weak fine subangular blocky structure; very friable; common fine, common medium, and common coarse roots throughout; very strongly acid, pH 4.7; gradual smooth boundary.
Bt1—31 to 48 centimeters; yellowish brown (10YR 5/6) broken face silty clay loam; moderate medium subangular blocky structure; friable; common fine, common medium, and common coarse roots throughout; 15 percent faint clay films on all faces of peds; very strongly acid, pH 4.7; gradual smooth boundary.
Bt2—48 to 69 centimeters; yellowish brown (10YR 5/6) broken face silty clay loam; moderate medium subangular blocky structure; friable; common fine, common medium, and common coarse roots throughout; 25 percent faint clay films on all faces of peds; very strongly acid, pH 4.7; gradual smooth boundary.
BC—69 to 89 centimeters; brownish yellow (10YR 6/6) broken face silty clay loam; 9 percent medium distinct yellowish red (5YR 5/6) and 9 percent fine distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine, common medium, and common coarse roots throughout; 10 percent flat angular 2- to 30-millimeter shale fragments; extremely acid, pH 4.0; abrupt wavy boundary.
Cr—89 to 99 centimeters; moderately cemented shale and siltstone bedrock.

Range in Characteristics

Depth to restrictive feature: 76 to 102 centimeters to paralithic bedrock
Diagnostic feature(s): Ochric epipedon and cambic horizon
Surface fragments: None
Seasonal high water table: Greater than 183 centimeters

A horizon(s):
- Hue—10YR
- Value—3 or 4 moist
- Chroma—2 or 3 moist
- Texture—silt loam
- Fragment content—0 to 10 percent
- Reaction—pH 3.6 to 7.3
- Organic matter content—0.5 to 4.0 percent

BE horizon(s):
- Hue—7.5YR to 10YR
- Value—4 to 6 moist
- Chroma—4 to 6 moist
- Texture—silt loam
- Fragment content—0 to 10 percent
- Reaction—pH 3.6 to 7.3
- Organic matter content—0.5 to 4.0 percent

Bt horizon(s):
- Hue—7.5YR to 10YR
- Value—4 to 6 moist
- Chroma—4 to 6 moist
- Texture—silt loam, silty clay loam
- Fragment content—0 to 10 percent
- Reaction—pH 3.6 to 6.0
- Organic matter content—0.0 to 0.5 percent

BC or C horizon(s) (where present):
- Hue—7.5YR to 2.5Y
- Value—4 to 6 moist
- Chroma—4 to 6 moist
- Texture—silty clay loam
- Fragment content—0 to 15 percent
- Reaction—pH 3.6 to 6.0
- Organic matter content—0.0 to 0.5 percent

Cr horizon(s):
- Texture—weathered acid shale, siltstone, and sandstone bedrock

Formation of the Soils

This section relates the factors of soil formation to the soils in the Big South Fork National River and Recreation Area. It also describes the geologic relationships and landforms in the survey area.

Factors of Soil Formation

Soils are a collection of natural bodies that occupy portions of the earth's surface. They are formed by the interaction of topography, climate, and living organisms with parent material over a period of time. Because of these processes, the soils formed are unique in properties and features. When any of the soil-forming factors change, a different soil may form.

The processes of soil formation are a sequence of events, including both complicated reactions and comparatively simple rearrangements of matter, that can directly or indirectly affect the soil that is formed. Numerous events may take place simultaneously or in sequence to mutually reinforce or contradict each other (Buol, Hole, and McCracken, 1989). The five soil-forming factors (parent material, topography, climate, living organisms, and time) and how they interact are described in the following paragraphs.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It is a product of the weathering or decomposing of the underlying bedrock or transported material. Weathering refers to the chemical and physical disintegration and decomposition of rock and minerals. Of the five soil-forming factors, parent material has the greatest effect on soil formation in the Big South Fork NRRA. It influences the physical characteristics, as well as the chemical and mineralogical composition, of the soil. Generally, the younger the soil the more the more the soil has been influenced by and can be related to the parent material. As weathering continues, the influence of the initial material is lessened. For example, Ramsey soils, which are relatively young in soil formation, are shallow to sandstone bedrock and consist mostly of sand-sized particles weathered from the original bedrock.

A large portion of the soils in the Big South Fork NRRA formed in residuum, or material that weathered in place from a parent rock or initial material. Examples are Ramsey and Lily soils, which formed in residuum derived from high-silica sandstone that underlies much of the Cumberland Plateau, and Gilpin and Sequoia soils, which formed in residuum derived from shale and siltstone. In this survey area most of the soils on the side slopes of gorges formed in colluvial material. Bouldin and Shelocta soils formed in these areas. Shelocta soils are an example of soils that formed from a mixed parent material source of shale, siltstone, and sandstone. Bouldin soils formed in colluvium dominated by material derived from the overlying sandstone escarpments. As a result, rock fragments ranging from channers 2 to 76 millimeters in

size to boulders ranging to greater than 600 millimeters in size occur throughout the soil profile. Colluvial soils can be found on the head slopes and footslopes of the gorges.

A small percentage of the soils in the survey area formed in alluvium, which is weathered material that has been moved and deposited by water. Alluvial material can be recent in age in drainageways and on flood plains where little weathering and soil development have occurred, or it can be of an older age on high terraces where soils are well developed. All of the alluvial soils within the survey area are young in age. Soils formed in alluvium tend to be deep and less sloping than the soils on the surrounding uplands. Atkins, Pope, and Skidmore soils formed on flood plains and in drainageways in recent alluvium.

Topography

Topography relates to the variations in the surface of the land. Changes in landscape occur over periods of time. The rate of development depends on several factors, mainly on the resistance of the existing features to the type of environmental forces attempting to make the changes and on the intensity of the environmental forces involved. Therefore, the age of a soil or the amount of pedogenic processes it has been subjected to is determined to a large extent by the stability of the surface (Buol, Hole, and McCracken, 1989).

The steepness of the slope is the most visual part of the topography. Processes on hillslopes are controlled directly by gravity (Ruhe, 1975). Water infiltrating soils flows downward and laterally. This water moves to the lowest part of the landscape where it accumulates unless the soils are adequately drained, both internally and externally. For example, the poorly drained Atkins soils receive runoff and lateral seepage from Lily and Ramsey soils, which are on the adjacent hillslopes. Lily and Ramsey soils have substantial lateral water movement, have loamy textures, and are shallow or moderately deep over sandstone. Water on a hillslope not only erodes the soils, transports debris, and deposits sediment, it also infiltrates the mass and may alter its physical properties. In a plastic state the mass may move downslope under the force of gravity (Ruhe, 1975). This movement may occur as very slow creep or as catastrophic landslides.

Other factors such as freezing and thawing, the hazard of windthrow, and the activity of animals contribute to creep and downslope movement of the soils. Under conditions that favor instability, the upper layer of soil may move as much as 6 inches per year on slopes of about 30 percent (Ruhe, 1975).

On steeper side slopes, especially in mountainous areas and in gorges, the slope and aspect help to determine the kinds of soil and vegetation that occur. Orientation of the slope modifies or intensifies the effect of climate. South- and west-facing slopes receive more direct sunlight than north- and east-facing slopes. Because of the higher temperatures on the south- and west-facing slopes, the rates of moisture evaporation and of decomposition of organic matter are increased. North- and east-facing slopes are cooler and have higher moisture content than south- and west-facing slopes and, in some cases, have a thicker layer of humus on the surface. Differences in the understory and herbaceous layer on opposite slopes are significant (Braun, 1942). Elevation also has a similar effect: cooler temperatures are at the higher elevations and warmer temperatures are at the lower elevations.

Topography also influences soil formation in relation to the nature of the initial parent materiel. In thick, resistant sandstone lenses, the soils on rolling uplands formed in the very upper part of the bedrock. Soils such as Bouldin soils on side slopes of gorges and mountain slopes below the thick sandstone layer formed in thick, story regolith that accumulated as the escarpment eroded.

Climate

The two most commonly measured features of climate that have been correlated to soil properties are rainfall and temperature. Climate not only exhibits its influence on soil formation by controlling some of the chemical and physical reactions taking place in the soil, it also has control of the organic factor. As important as average climatic conditions are to soil formation, the extremes of weathering occurring in a given climatic region may be more influential in the development of certain properties of soils.

The climate of the survey area is temperate and humid. Several soil properties are temperature dependent. The color of soil tends to become redder as temperature increases. Bases are more subject to leaching in warm areas, and the nitrogen content and the organic matter content decrease as temperature increases. The content of clay tends to increase with an increase in temperature (Buol, Hole, and McCracken, 1989).

The total annual precipitation is about 140 centimeters, and the average seasonal snowfall is about 28 centimeters. The amount of precipitation supports a productive forest ecosystem that returns substantial amounts of organic matter to the soils. The abundance of precipitation also results in the leaching of many soluble bases from the soils. This leaching results in the formation of acidic soils that have low natural fertility. The content of the clay in the subsoil increases with an increase in the amount of rainfall. In some cases soils on the flood plains retain high bases within the soil profile, as with Skidmore soils. Skidmore soils are located on narrow flood plains in drainageways and gorges. During the brief periods of frequent flooding, the floodwaters bring bases into the soil profile. The high bases in Skidmore soils could also result from water carrying bases from the surrounding Mississippian-age geology.

Living Organisms

Before the survey area was settled and cleared, the soils on the Cumberland Plateau supported oaks and a mixture of hardwoods and pine with a few openings of native grasses, or meadows. Trees and plants in the forest ecosystem have significantly affected soil formation. Trees have a large root system for support and for the intake of water and nutrients. As trees grow, their roots create great pressure that helps break up rock and other parent material. As the roots decay, they leave channels that increase the rate of water infiltration. These channels become filled with more porous soil from the upper horizons. Trees that are blown over by strong winds uproot areas of soils and thus aid in the mixing of soil.

The most important soil-forming processes in a forest ecosystem are the capture of energy and substance through photosynthesis, decomposition of plant residue, cation exchange, and the formation of organic-mineral complexes. The material that the plants of an eco-system mobilize and circulate tends to be deposited within the system and recycled many times before eventual escape (Buol, Hole, and McCracken, 1989). The deposition and decomposition of leaf litter help prevent nutrient loss, conserve soil moisture, and reduce the depth to which frost penetrates. Soils that formed in acidic leaf litter, such as pine, mountain laurel, and rhododendron litter, are more acid and have a lower base saturation than soils that formed primarily under hardwoods.

Channels are excavated in the soils by insects, crustaceans, reptiles, amphibians, and burrowing mammals such as moles. Soils that have a high water table, such as Atkins, may have crawfish tunnels. Crawfish bring substantial amounts of soil to the surface and may impede the development of soil horizons or destroy horizons already formed.

Over many years soils in the survey area have been heavily influenced by human activity, including farming, logging of timber, and deep shaft coal mining. Each activity

Figure 15.—An area of Itmann very parachannery loam, 4 to 55 percent slopes.

has had its own affect on the soils. Many of the upland soils that have been either farmed or logged have thin surface horizons as a result of increased erosion. The soil moved by the erosion is transported and deposited on lower footslopes, in drainageways, and on flood plains.

Anthropogenic Soils As a Result of Human Activity

Coal has been mined from the Central Appalachian Basin for more than 200 years. The area that is now the Big South Fork NRRA lies in the southern portion of the Central Appalachian Basin. In some cases human activity can actually create a soil. For example, Itmann soils were created as a result of deep shaft coal mining (fig. 15). These soils formed in acid regolith of waste materials from deep mined coal. As the coal trains rode either north or south, the waste material in many cases was simply dumped over the side of the coal car. As a result, the regolith is a mixture of partially weathered fine earth and fragments of bedrock which has been crushed by machinery and weathered. These areas in Kentucky can be indentified on aerial photography. They are barren or support vegetation such as grasses, hardwoods, and very commonly pines. The areas in Tennessee are much harder to spot by using aerial photography and are more heavily vegetated with hardwoods.

Time

Time is needed for the climate and living organisms to act upon the parent material with associated topographic influences. Soil formation cannot be expressed in chronologic time only. The age of a soil is determined by the extent of the development of pedogenic horizons and other features. Entisols (Itmann soils) and some Inceptisols (Atkins, Skidmore, Pope, and Petros soils) may be considered young or youthful soils. Ultisols (Shelocta, Lily, Gilpin, Bouldin, and Sequoia soils) are

considered to be mature or old soils. They have developed an argillic horizon, which is characterized by an accumulation of silicate clays moved downward by water. Because there is little or no evidence of clay movement in soils on the youngest landscapes, it is concluded that the formation of an argillic horizon ordinarily requires a few thousand years (USDA-NRCS, 1999). Other soil properties may take much less time to develop when combined with other soil-forming factors. For instance, due to the high biologic activity in grassland soils over 100 years, soils under prairie vegetation have developed an A horizon that is 25 to 30 centimeters thick (Hallberg, Wollenhaupt, and Miller, 1978). Due to the increased amount of biologic activity, it takes less time to form a thicker and more fertile surface texture in soils that formed under grasslands than in forest soils where biological activity is much less.

Other soil-forming factors impede or accelerate development over time. Soils that formed in material derived from resistant bedrock, such as high-silica sandstone, may be old in chronologic years but young in soil development. An example is Ramsey soils. The stability of the soil surface also affects the degree of soil development. After a time of disequilibrium, a steady state of both soil formation and downwasting of the landscape is reached (Buol, Hole, and McCracken, 1989).

Geologic Relationships and Landforms

The Big South Fork NRRA is located on the northern portion of the Cumberland Plateau and is underlain by the highly dissected rocks of Pennsylvanian-age sandstone, shale, and siltstone and Mississippian-age rocks consisting of limestone, calcareous shale, and siltstone. The Paragon Formation, consisting of limestone and shale and Mississippian in age, underlies the Pennsylvanian sandstone, siltstone, and shale. The limestone portion of the Paragon Formation only exposes itself at the river and therefore plays an insignificant part in the formation of the surrounding soils. However, the shale portion of the Paragon Formation begins its exposure on the southern faces of ridges at Charit Creek and No Business in Tennessee. As the formation extends north into Kentucky, the exposure on the slopes of the gorge becomes higher in elevation.

The soils in the gorge begin to change from south to north. In the extreme southern portion of the park beginning in Morgan County, the Pennsylvanian-age shale and siltstone give rise to Petros and Gilpin soils, which formed in residuum of siltstone and shale and are found on the upper third of the side slopes in convex areas. Bouldin soils formed in colluvium from the weathering of the sandstone caprock or escarpment and can be found on head slopes and the footslopes of the gorge. Where the Paragon Formation exposure begins and extends into Kentucky, the soil components that formed in residuum are lost and Shelocta soils, which formed in colluvium from sandstone, siltstone, and shale, become the dominant component in association with Bouldin soils.

Throughout the Big South Fork of the Cumberland River, in the uppermost portions of the gorge and side slopes, the Pennsylvannian-age sandstone caprock (Rockcastle Conglomerate) exposes itself up to heights ranging from 3 meters to more than 91 meters in the form of free faces as well as sandstone windows and arches (fig. 16). The Rockcastle Conglomerate is the most erosion-resistant stratum in the region. Shallow soils, such as Ramsey, and moderately deep soils, such as Lily, formed from this stratum. Along the edges of the plateau, the caprock is being eroded by slope retreat. During this process, the underlying Pennsylvanian-age shales and siltstones are also vulnerable to chemical solution. It is hypothesized that in the case of the Cumberland Plateau, caprock removal and erosion by slope retreat are being greatly assisted by the almost impermeable nature of the overlying sandstone conglomerate itself. Due to its resistant nature, the sandstone conglomerate in places tends to create a perched water table. One such example is the areas of Atkins-Lily complex, 0

Figure 16.—An exposed Pennsylvannian-age sandstone caprock in an area of Rock outcrop–Ramsey complex, 20 to 70 percent slopes, is in the background. An area of Gilpin-Bouldin complex, 20 to 75 percent slopes, very stony, is below the sandstone escarpment, on the side slopes of the gorge.

to 20 percent slopes, occasionally flooded, found in drainageways along Darrow Ridge and Tar Kiln Ridge. These perched water tables create poorly drained soils in long and narrow drainageways between sandstone residuum ridges. The perched water tables also form waterfalls that pour over the plateau's edge onto the shale and siltstone slopes underlying the sandstone caprock. The waterfalls have infiltrated joints and fractures in the caprock to reach and erode the underlying shale, siltstone, and mudstone. As a result, the overlying caprock breaks away for many kilometers, creating canyons and gorges up to 200 to 300 meters deep into the plateau (Crawford, 1987). When the caprock breaks away it forms colluvial soils, such as Bouldin and Shelocta, containing rock fragments ranging in size from channers as small as 2 millimeters to boulders as large as 30 cubic meters.

The many joints and fractures in the Pennsylvanian-age sandstone caprock when pentrated by water also give rise to natural arches, bridges, windows, and pillars (fig. 17). The joints become pathways for water, and it is the aspect of jointing that is most important in natural bridge development (Corgan and Parks, 1979). Natural bridges, arches, and windows are formed in many ways depending on the bedrock type. On the central part of the Cumberland Plateau, the sandstone arches and bridges are primarily formed by a combination of headward erosion, dome collapse, joint widening, and other subtle stratigraphic complexities such as the sedimentary grain size of the sandstone caprock of the Cumberland Plateau (Corgan and Parks, 1979). Rocks impose an orientation on the movement of water and on the development of the landscape (Corgan and Parks, 1979). If surrounded by well indurated rock, zones that are easily eroded can develop into natural bridges. A long, poorly lithified sand that is contained within better lithified sandstone seems to account

for the development of the East Tunnel in Scott County, Tennessee, and is the only natural bridge that seems entirely due to sedimentary grain. Local rock characteristics serve to localize the development of other bridges (Corgan and Parks, 1979).

There are many arches and natural bridges located throughout the park in both Tennessee and Kentucky. At Blue Heron in the Kentucky portion of the park, there are several smaller arches that have formed from the same processes as the larger ones. The largest, the Twin Arches located in the Tennessee portion of the park, are excellent examples of bridge formation resulting in headward erosion. In stream systems, erosion can be intense in the extreme headwater region. Here, active gully growth is focused in the upstream, or headward, direction. This process of headward erosion can give rise to natural bridges where headward stream growth is blocked by especially resistant beds of rock (Corgan and Parks, 1979). Wetting and drying, freezing and thawing, spring action, and a variety of smaller scale erosional processes can combine to facilitate headward erosion (Corgan and Parks, 1979).

One example of dome collapse is the Dome Rock House located at Station Camp Area. In the studies of cavern breakdown, Wiliam E. Davis explains that a tension dome can develop within the rocks that overlie a cave. Unsupported strata in the roof of the cave should sag, and one can actually measure sag in typical caverns (Davis, 1951). The beds in the area of sagging do not touch each other or support the weight of the overlying bedrock, and the weight above and within the tension dome must be born by the cave walls (Corgan and Parks, 1979). Eventually, the beds collapse, individually forming the tension dome of a rock house, rock shelter, or a cliff overhang. This process in combination with the erosion and removal of the underlying siltstone, shale, and sandstone has also created many cliff overhangs and rock shelters directly under the cliffs of the exposed sandstone caprock. The cliff overhangs or rock shelters

Figure 17.—A view of one of several small arches or natural bridges located at Blue Heron in the Big South Fork National River and Recreation Area.

Figure 18.—A rock shelter in the gorge of the Big South Fork of the Cumberland River.

are located at the very base of the caprock in canyons or gorges and have been used as shelters for many types of settlers throughout the centuries (fig. 18). Native Americans used them as shelters while hunting in the area; thereafter, many white settlers also used them as shelters from the weather when traveling or hunting in the area.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Anthropogenic feature. An artificial feature on the land surface, having a characteristic shape and range in composition, composed of unconsolidated earthy, organic materials, artificial materials, or rock, that is the direct result of human manipulation or activities; can be either constructional (e.g., artificial levee) or destructional (quarry).

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9

High ..... 9 to 12
Very high ..... more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

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.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow, very steep-sided valley with high, precipitous walls in an area of high local relief.

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.

Caprock. A hard rock layer, usually sandstone, lava, or ,in arid environments, limestone, that lies above shale or other less resistant bedrock or sediments; specifically a rock layer that forms relatively level, resistant topmost strata that hold up hills, ridges, mesas, etc. and commonly forms cliffs and escarpments. A hard rock layer, usually sandstone, overlying the shale above a coal bed.

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.

Channer. A thin, flat rock fragment up to 150 millimeters on the long axis.

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.

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.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

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.

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.”

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.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cove. A wide, gently sloping to steep, concave colluvial area. Coves are commonly located at the head of or along drainageways in mountainous areas.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

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.

Desert pavement. On a desert surface, a layer of gravel or larger fragments that was emplaced by upward movement of the underlying sediments or that remains after finer particles have been removed by running water or the wind.

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.

Dome (geomorphology). A smoothly rounded landform of rock mass, such as a rock-capped mountain summit, that roughly resembles the dome of a building.

Dome (structural geology). An uplift or anticlinal structure, either circular or elliptical in outline, in which rocks dip gently away in all directions. A dome may be small or many kilometers in diameter.

Downcutting. A geological process that deepens the channel of a stream or valley by removing material from the stream's bed or the valley's floor.

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. A term restricted to relatively small, roughly linear or arcuate depressions that move concentrated water at some time and either lack a defined channel or have a small defined channel.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

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.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

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.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine-earth fraction. The part of the soil material that is less than 2 millimeters in size.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

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.

Formation. The basic lithostratigraphic unit in the local classification of rocks.

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.

Free face. The part of a hillside or mountainside consisting of an outcrop of bare rock (scarp or cliff) that sheds colluvium to slopes below, and commonly stands more steeply than the angle of repose of, the colluvial slope.

Free face (geomorphology). A geomorphic component of hills and mountains consisting of an outcrop of bare rock that sheds rock fragments and other sediments to, and commonly stands more steeply than the angle of repose of, the colluvial slope immediately below. Most commonly found in shoulder and backslope positions and can comprise part or all of a nose, crest, nose slope, side slope, head slope, or base slope.

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.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Gorge. (a) A narrow, deep valley with nearly vertical, rocky walls, smaller than a canyon and more steep-sided than a ravine; especially a restricted, steep-walled part of a canyon. (b) A narrow defile or passage between hills or mountains.

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.

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.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of

decomposition between the less decomposed fibric material and the more decomposed sapric material.

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.

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.

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.

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

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.

Joint (geology). A surface of actual or potential fracture or parting in a rock, without displacement. The surface is usually planar and often occurs with parallel joints to form part of a joint set.

Kame. An irregular, short ridge or hill of stratified glacial drift.

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.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Landform. Any physical, recognizable form or feature on the earth's surface, having a characteristic shape and range in composition, and produced by natural causes. It can span a wide range in size.

Landscape. An assemblage, group, or family of spatially related, natural landforms over a relatively large area; the land surface which the eye can comprehend in a single view.

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.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Major land resource area (MLRA). A broad geographic area that has a distinct combination of physiography, geology, climate, hydrology, soils, biological resources, and land use.

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.

Mass wasting. The downslope movement of rock and regolith near the earth's surface mainly due to the force of gravity.

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.

Mesic temperature regime. A soil temperature regime that has a mean annual soil

temperature of 8 degrees C or more but less 15 degrees C and has greater than 5 degrees C difference between mean annual summer and mean annual winter soil temperature at 50 centimeters below the surface.

Mine spoil or earthy fill. An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

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).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

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.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher-lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Perennial stream. A stream or reach of a stream that flows continuously throughout the year and whose surface is generally lower than the water table adjacent to the region adjoining the stream.

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:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are

artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

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.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Redoximorphic processes. Chemical changes in the soil associated with the wetness that result from the reduction and oxidation of iron and manganese compounds in the soil after saturation with water and desaturation, respectively.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.
Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.
Ridge. A long, narrow elevation of the land surface, usually sharp crested with steep sides and forming an extended upland between valleys.
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 (geomorphology). A geomorphic component of terraces, flood-plain steps, and other stepped landforms consisting of a vertical or steep side slope (e.g., escarpment) typically of minimal aerial extent.
Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.
Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.
Root zone. The part of the soil that can be penetrated by plant roots.
Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.
Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.
Sandstone. Sedimentary rock containing dominantly sand-sized particles.
Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.
Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.
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.
Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.
Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
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. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.
Shale. Sedimentary rock formed by the hardening of a clay deposit.
Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.
Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.
Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.
Silica. A combination of silicon and oxygen. The mineral form is called quartz.
Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their

clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). 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 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.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 3 percent
Gently sloping	2 to 5 percent
Sloping	5 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 35 percent
Very steep	35 percent and higher

Classes for complex slopes are as follows:

Nearly level	0 to 3 percent
Undulating	2 to 5 percent
Rolling	5 to 12 percent
Hilly	12 to 20 percent
Steep	20 to 35 percent
Very steep	35 percent and higher

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of

the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratigraphy. The branch of geology that deals with the definition and interpretation of layered earth materials; the conditions of their formation; their character, arrangement, sequence, age, and distribution; and especially their correlation by the use of fossils and other means.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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.

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.

Talf (geomorphology). A geomorphic component of flat plains consisting of an essentially flat (e.g., 0 to 1 percent slopes) and broad area dominated by closed depressions and a non-integrated or poorly integrated drainage system. Precipitation tends to pond locally, and lateral transport is slow both above and below ground, which favors the accumulation of soil organic matter and a retention of fine-earth sediments. Better drained soils are commonly adjacent to drainageways.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

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.

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."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.—Temperature and Precipitation

(Recorded in the period 1961-90 at Oneida, Tennessee)

Month	Temperature (degrees C)						Precipitation (millimeters)				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temp. higher than--	Minimum temp. lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snow-fall
January--	6.0	-6.9	-0.5	20.0	-26.1	48	110	71	146	9	127
February-	8.56	-5.3	1.6	22.8	-21.1	72	104	60	144	8	91
March----	14.6	-0.4	7.1	26.7	-13.9	209	141	84	191	10	10
April----	20.2	4.1	12.2	30.6	-6.1	415	119	74	160	9	3
May------	24.1	8.7	16.4	31.1	-1.7	648	131	82	176	9	0.0
June-----	27.8	13.6	20.7	33.3	3.9	851	112	61	157	8	0.0
July-----	29.5	16.1	22.8	35.0	8.9	1,009	137	72	194	9	0.0
August---	29.0	15.4	22.2	34.4	7.8	974	107	55	152	7	0.0
September	26.0	11.8	18.9	32.8	1.1	765	98	56	135	7	0.0
October--	20.8	4.7	12.8	30.0	-6.1	459	104	51	150	6	0.0
November-	14.7	0.2	7.5	26.1	-11.7	209	114	74	150	9	13
December-	8.8	-4.2	2.3	21.1	-19.4	85	112	59	158	8	38
Yearly:											
Average	19.2	4.8	12	---	---	---	---	---	---	---	---
Extreme	38.9	-32.2	---	35.6	-26.7	---	---	---	---	---	---
Total--	---	---	---	---	---	5,745	1,389	799	1,913	99	282

* 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 (4 degrees C).

Table 2.—Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Oneida, Tennessee)

Probability	Temperature		
	-4.4 °C or lower	-2.2 °C or lower	0 °C or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 20	May 5	May 18
2 years in 10 later than--	Apr. 14	Apr. 29	May 12
5 years in 10 later than--	Apr. 3	Apr. 16	May 1
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 17	Oct. 8	Sept. 27
2 years in 10 earlier than--	Oct. 23	Oct. 13	Oct. 2
5 years in 10 earlier than--	Nov. 4	Oct. 22	Oct. 11

Table 3.—Growing Season

(Recorded in the period 1961-90 at Oneida, Tennessee)

Probability	Daily minimum temperature during growing season		
	Higher than -4.4 °C	Higher than -2.2 °C	Higher than 0 °C
	Days	Days	Days
9 years in 10	189	168	139
8 years in 10	197	175	147
5 years in 10	214	188	163
2 years in 10	231	202	179
1 year in 10	240	209	187

Table 4.—Hectares and Proportionate Extent of the Soils

Map symbol	Soil name	Hectares	Percent
Ak	Atkins loam, ponded	19	*
AyD	Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded	48	*
Az	Atkins-Skidmore complex, frequently flooded	31	*
GaC	Gilpin silt loam, 5 to 12 percent slopes	820	1.6
GaD	Gilpin silt loam, 12 to 20 percent slopes	473	0.9
GbF	Gilpin-Bouldin complex, 20 to 75 percent slopes, very stony	14326	28.3
GdF	Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony	2700	5.3
GpE	Gilpin-Petros complex, 20 to 35 percent slopes	1005	2.0
GpF	Gilpin-Petros complex, 35 to 75 percent slopes	82	0.2
GsB	Gilpin-Sequoia complex, 2 to 5 percent slopes	52	0.1
GsC	Gilpin-Sequoia complex, 5 to 12 percent slopes	465	0.9
GsD	Gilpin-Sequoia complex, 12 to 20 percent slopes	424	0.8
ItE	Itmann very parachannery loam, 4 to 55 percent slopes	22	*
LdB	Lily loam, 2 to 5 percent slopes	339	0.7
LdC	Lily loam, 5 to 12 percent slopes	2272	4.5
LdD	Lily loam, 12 to 20 percent slopes	1180	2.3
LgC	Lily-Gilpin complex, 5 to 12 percent slopes	1437	2.8
LgD	Lily-Gilpin complex, 12 to 20 percent slopes	2252	4.5
LgE	Lily-Gilpin complex, 20 to 35 percent slopes	4084	8.1
LmC	Lily-Ramsey complex, 5 to 12 percent slopes	884	1.7
LmD	Lily-Ramsey complex, 12 to 20 percent slopes	3315	6.6
LmE	Lily-Ramsey complex, 20 to 35 percent slopes	4694	9.3
LoB	Lonewood silt loam, 2 to 5 percent slopes	299	0.6
LoC	Lonewood silt loam, 5 to 12 percent slopes	614	1.2
Ps	Pope-Skidmore complex, 0 to 4 percent slopes, frequently flooded	669	1.3
RaF	Rock outcrop-Ramsey complex, 20 to 70 percent slopes	3196	6.3
SaC	Shelocta silt loam, 5 to 12 percent slopes	6	*
SaD	Shelocta silt loam, 12 to 20 percent slopes	36	*
SaE	Shelocta silt loam, 20 to 35 percent slopes	6	*
SbF	Shelocta-Bouldin complex, 30 to 75 percent slopes, extremely stony, very rocky	3791	7.5
Sk	Skidmore very gravelly sandy loam, 0 to 10 percent slopes, frequently flooded	4	*
W	Water	646	1.3
WnB	Wernock silt loam, 2 to 5 percent slopes	126	0.2
WnC	Wernock silt loam, 5 to 12 percent slopes	268	0.5
	Total	50,586	100.0

* Less than 0.1 percent.

Table 5.—Land Capability and Non-Irrigated Yields by Map Unit

(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	Grass-legume hay	Pasture
		Tons	AUM
Ak:		---	---
Atkins, ponded	5w		
Ak:		---	---
Atkins, ponded	5w		
AyD:		2.50	3.60
Atkins, occasionally flooded	3w		
Lily	4e		
Az:		2.00	3.60
Atkins, frequently flooded	3w		
Skidmore, frequently flooded	2w		
GaC:		3.00	5.40
Gilpin	3e		
GaD:		2.50	6.00
Gilpin	4e		
GbF:		---	---
Gilpin, stony	7s		
Bouldin, very stony	7s		
GdF:		---	---
Gilpin, stony	7s		
Bouldin, very stony	7s		
Petros, stony	7s		
GpE:		---	---
Gilpin	7s		
Petros	7s		
GpF:		---	---
Gilpin	7s		
Petros	7s		
GsB:		3.00	6.00
Gilpin	2e		
Sequoia	2e		
GsC:		3.00	6.00
Gilpin	3e		
Sequoia	3e		
GsD:		2.50	6.00
Gilpin	4e		
Sequoia	4e		
ItE:		---	---
Itmann, unstable fill	8		

Table 5.—Land Capability and Non-Irrigated Yields by Map Unit—Continued

Map symbol and soil name	Land capability	Grass-legume hay	Pasture
		Tons	AUM
LdB:		3.50	7.00
Lily	2e		
LdC:		3.50	7.00
Lily	3e		
LdD:		3.50	7.00
Lily	4e		
LgC:		4.50	6.00
Lily	3e		
Gilpin	3e		
LgD:		2.80	5.40
Lily	4e		
Gilpin	4e		
LgE:		2.80	5.40
Lily	6e		
Gilpin	6e		
LmC:		3.00	3.00
Lily	6e		
Ramsey	6e		
LmD:		2.50	3.00
Lily	6e		
Ramsey	6e		
LmE:		2.00	3.00
Lily	7e		
Ramsey	7e		
LoB:		3.20	7.00
Lonewood	2e		
LoC:		2.80	6.50
Lonewood	3e		
Ps:		3.00	7.00
Pope, frequently flooded	2w		
Skidmore, frequently flooded	2w		
RaF:		---	---
Rock outcrop.			
Ramsey	7s		
SaC:		4.50	8.00
Shelocta	3e		
SaD:		3.00	7.00
Shelocta	4e		
SaE:		---	---
Shelocta	6e		

Table 5.—Land Capability and Non-Irrigated Yields by Map Unit—Continued

Map symbol and soil name	Land capability	Grass-legume hay	Pasture
		Tons	AUM
SbF:		---	---
Shelocta, extremely stony	7s		
Bouldin, extremely stony	7s		
Sk:		---	---
Skidmore, frequently flooded	2w		
W.		---	---
Water			
WnB:		4.00	8.00
Wernock	2e		
WnC:		4.00	8.00
Wernock	3e		

Table 6.—Acreage by Capability Class and Subclass

Capability class	Capability subclass	Hectares
Unclassified	---	2564.1
2	e	709
2	w	652
3	e	5146.4
3	w	45.3
4	e	3951.4
5	w	16.2
6	e	7466.1
7	e	4459.2
7	s	19804.1
8	---	19.8

Table 7.—Prime and Other Important Farmlands

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland. If a soil is prime or important farmland only under certain conditions, the conditions are specified in the "Farmland classification" column)

Map symbol	Map unit name	Farmland classification
GsB	Gilpin-Sequoia complex, 2 to 5 percent slopes	All areas are prime farmland
LdB	Lily loam, 2 to 5 percent slopes	All areas are prime farmland
LoB	Lonewood silt loam, 2 to 5 percent slopes	All areas are prime farmland
WnB	Wernock silt loam, 2 to 5 percent slopes	All areas are prime farmland
AyD	Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded	Farmland of statewide importance
GaC	Gilpin silt loam, 5 to 12 percent slopes	Farmland of statewide importance
GsC	Gilpin-Sequoia complex, 5 to 12 percent slopes	Farmland of statewide importance
LdC	Lily loam, 5 to 12 percent slopes	Farmland of statewide importance
LgC	Lily-Gilpin complex, 5 to 12 percent slopes	Farmland of statewide importance
LoC	Lonewood silt loam, 5 to 12 percent slopes	Farmland of statewide importance
SaC	Shelocta silt loam, 5 to 12 percent slopes	Farmland of statewide importance
WnC	Wernock silt loam, 5 to 12 percent slopes	Farmland of statewide importance
Az	Atkins-Skidmore complex, frequently flooded	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Ps	Pope-Skidmore complex, 0 to 4 percent slopes, frequently flooded	Prime farmland if protected from flooding or not frequently flooded during the growing season

Table 8.—Hydric Soils

(This report includes only hydric components. Map units with no hydric components are not listed. Definitions of hydric criteria codes are included at the end of the report)

Map symbol and map unit name	Component	Percent of map unit	Hydric	Landform	Hydric soils criteria			
					Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
Ak:								
Atkins loam, ponded	Atkins, ponded	85	Yes	flood plains	2B3, 3	Yes	No	Yes
AyD:								
Atkins-Lily complex, 0 to 20 percent slopes, occasionally flooded	Atkins, occasionally flooded	66	Yes	flood plains	2B3	Yes	No	No
Az:								
Atkins-Skidmore complex, frequently flooded	Atkins, frequently flooded	45	Yes	flood plains	2B3	Yes	No	No

Explanation of hydric criteria codes:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   - B. are poorly drained or very poorly drained and have either:
     1.) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
     2.) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
     3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

Table 9.—Index of Plant Symbols, Common Names, and Scientific Names

(Plants displayed occur within the National Soils Information System (NASIS) plant tables used for the soil survey area. The scientific and common names are referenced at the USDA PLANTS database: plants.usda.gov)

Plant symbol	Local common name	Scientific name
ABCO	white fir	Abies concolor
ACER	maple	Acer
ACRU	red maple	Acer rubrum
ACSA3	sugar maple	Acer saccharum
AESCU	buckeye	Aesculus
ASTR	common pawpaw	Asimina triloba
BENI	river birch	Betula nigra
CAAR18	Siberian peashrub	Caragana arborescens
CACA18	American hornbeam	Carpinus caroliniana
CAGL8	pignut hickory	Carya glabra
CARYA	hickory	Carya
CECA4	eastern redbud	Cercis canadensis
CEOC	common hackberry	Celtis occidentalis
COAM2	silky dogwood	Cornus amomum
COFL2	flowering dogwood	Cornus florida
CRPH	Washington hawthorn	Crataegus phaenopyrum
DESMO	ticktrefoil	Desmodium
ELAN	Russian olive	Elaeagnus angustifolia
ELUM	autumn olive	Elaeagnus umbellata
EUAT3	wahoo	Euonymus atropurpureus
FAGR	American beech	Fagus grandifolia
FRAM2	white ash	Fraxinus americana
FRPE	green ash	Fraxinus pennsylvanica
GAYLU	huckleberry	Gaylussacia
GLTR	honeylocust	Gleditsia triacanthos
HYAR	wild hydrangea	Hydrangea arborescens
ILOP	American holly	Ilex opaca
JUNI	black walnut	Juglans nigra
JUVI	eastern redcedar	Juniperus virginiana
KALA	mountain laurel	Kalmia latifolia
LIAM	Amur privet	Ligustrum amurense
LIBE3	northern spicebush	Lindera benzoin
LIST2	sweetgum	Liquidambar styraciflua
LITU	yellow-poplar	Liriodendron tulipifera
LOJA	Japanese honeysuckle	Lonicera japonica
LOMA6	Amur honeysuckle	Lonicera maackii
LONIC	honeysuckle	Lonicera
LOTA	Tatarian honeysuckle	Lonicera tatarica
LYCO3	groundcedar	Lycopodium complanatum
MAAC	cucumber-tree	Magnolia acuminata
MAFL80	flowering crabapple	Malus floribunda
MAST4	starry false Solomon's seal	Maianthemum stellatum
OSVI	eastern hophornbeam	Ostrya virginiana
OXAR	sourwood	Oxydendrum arboreum
PAQU2	Virginia creeper	Parthenocissus quinquefolia
PIAB	Norway spruce	Picea abies
PIBA2	jack pine	Pinus banksiana
PIEC2	shortleaf pine	Pinus echinata
PINI	Austrian pine	Pinus nigra
PIPU	blue spruce	Picea pungens
PIRE	red pine	Pinus resinosa
PIST	eastern white pine	Pinus strobus
PITA	loblolly pine	Pinus taeda
PIVI2	Virginia pine	Pinus virginiana
PLOC	American sycamore	Platanus occidentalis
POAC4	Christmas fern	Polystichum acrostichoides
PODE3	eastern cottonwood	Populus deltoides
POPE	mayapple	Podophyllum peltatum

Table 9.—Index of Plant Symbols, Common Names, and Scientific Names—Continued

Plant symbol	Local common name	Scientific name
POPU4	hairy Solomon's seal	Polygonatum pubescens
PRSE2	black cherry	Prunus serotina
PRVI	common chokecherry	Prunus virginiana
QUAL	white oak	Quercus alba
QUCO2	scarlet oak	Quercus coccinea
QUERC	oak	Quercus
QUFA	southern red oak	Quercus falcata
QUMA2	bur oak	Quercus macrocarpa
QUPA2	pin oak	Quercus palustris
QUPR2	chestnut oak	Quercus prinus
QURU	northern red oak	Quercus rubra
QUVE	black oak	Quercus velutina
RHAR4	fragrant sumac	Rhus aromatica
RHODO	rhododendron	Rhododendron
RHUS	sumac	Rhus
ROMU	multiflora rose	Rosa multiflora
ROPS	black locust	Robinia pseudoacacia
RUBUS	blackberry	Rubus
SAAL5	sassafras	Sassafras albidum
SANI	black willow	Salix nigra
SMILA2	greenbrier	Smilax
SMRO	roundleaf greenbrier	Smilax rotundifolia
SPHAG2	sphagnum moss	Sphagnum
SYOR	coralberry	Symphoricarpos orbiculatus
SYVU	common lilac	Syringa vulgaris
THNO	New York fern	Thelypteris noveboracensis
THOC2	eastern arborvitae	Thuja occidentalis
TIAM	American basswood	Tilia americana
TIARE	foamflower	Tiarella
TORA2	eastern poison ivy	Toxicodendron radicans
TRILL	trillium	Trillium
TSCA	eastern hemlock	Tsuga canadensis
ULPU	Siberian elm	Ulmus pumila
VACCI	vaccinium	Vaccinium
VIAC	mapleleaf viburnum	Viburnum acerifolium
VIAE	summer grape	Vitis aestivalis
VIOPA2	American cranberrybush	Viburnum opulus var. americanum
VITIS	grape	Vitis

Table 10.—Forest Productivity

[Characteristic trees are pulled from the National Soil Information System (NASIS) component forest productivity table. The site index base corresponds to the site index curve used to determine the site index and the annual productivity of the forest overstory tree species displayed in this report. The site index base age indicates the age used for the site curves. The volume of wood fiber is the yield likely to be produced by the most important tree species at the age of culmination of the mean annual increment (CMAI). The volume is the amount of fiber produced in a fully stocked, even-aged, unmanaged stand. CMAI age is the point at which the stand reaches its maximum annual rate of growth. Trees to manage, where applicable, are defined in the "National Forestry Manual" as those trees preferred for planting, seeding, or natural regeneration and residual trees in thinning or partial harvest operations. Only the soil components suitable for forest management are listed]

Map unit symbol and soil name	Potential productivity				Trees to manage
	Characteristic trees	Site index	Site index base age	Volume of wood fiber (CMAI)	
		ft	yrs	cu ft/ac/yr	
Ak:					
Atkins, ponded	eastern cottonwood	89	30	95	eastern cottonwood, pin oak, sweetgum, yellow-poplar
	pin oak	100	50	90	
	sweetgum	90	50	81	
	yellow-poplar	90	50	90	
AyD:					
Atkins, occasionally flooded	eastern cottonwood	89	30	95	eastern cottonwood, pin oak, sweetgum, yellow-poplar
	pin oak	100	50	90	
	sweetgum	90	50	81	
	yellow-poplar	90	50	90	
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
Az:					
Atkins, frequently flooded	eastern cottonwood	89	30	95	eastern cottonwood, pin oak, sweetgum, yellow-poplar
	pin oak	100	50	90	
	sweetgum	90	50	81	
	yellow-poplar	90	50	90	
Skidmore, frequently flooded	eastern white pine	90	50	172	eastern white pine, loblolly pine, yellow-poplar
	northern red oak	80	50	57	
	Virginia pine	80	50	114	
	yellow-poplar	95	50	100	
GaC:					
Gilpin	black oak	80	50	57	northern red oak, yellow-poplar
	chestnut oak	80	50	57	
	northern red oak	80	50	57	
	scarlet oak	76	50	57	
	shortleaf pine	70	50	114	
	yellow-poplar	95	50	100	
GaD:					
Gilpin	black oak	80	50	57	northern red oak, yellow-poplar
	chestnut oak	80	50	57	
	northern red oak	80	50	57	
	scarlet oak	76	50	57	
	shortleaf pine	70	50	114	
	yellow-poplar	95	50	100	

Table 10.—Forest Productivity—Continued

Map unit symbol and soil name	Potential productivity				Trees to manage
	Characteristic trees	Site index	Site index base age	Volume of wood fiber (CMAI)	
		ft	yrs	cu ft/ac/yr	
GbF:					
Gilpin, stony	black oak	60	50	43	black oak, northern red oak, white oak, yellow-poplar
	northern red oak	80	50	57	
	white oak	75	50	57	
	yellow-poplar	90	50	100	
Bouldin, very stony	northern red oak	75	50	57	Virginia pine, northern red oak, shortleaf pine, white oak, yellow-poplar
	shortleaf pine	55	50	90	
	Virginia pine	60	50	81	
	white oak	50	50	38	
	yellow-poplar	90	50	86	
GdF:					
Gilpin, stony	black oak	60	50	43	black oak, northern red oak, white oak, yellow-poplar
	northern red oak	80	50	57	
	white oak	75	50	57	
	yellow-poplar	90	50	100	
Bouldin, very stony	northern red oak	75	50	57	Virginia pine, northern red oak, shortleaf pine, white oak, yellow-poplar
	shortleaf pine	55	50	90	
	Virginia pine	60	50	81	
	white oak	50	50	38	
	yellow-poplar	90	50	86	
Petros, stony	black oak	60	50	43	Virginia pine, black oak, chestnut oak, shortleaf pine, southern red oak
	chestnut oak	55	50	38	
	shortleaf pine	55	50	90	
	southern red oak	60	50	43	
	Virginia pine	60	50	86	
GpE:					
Gilpin	black oak	60	50	43	black oak, northern red oak, white oak, yellow-poplar
	northern red oak	80	50	57	
	white oak	75	50	57	
	yellow-poplar	90	50	100	
Petros	black oak	60	50	43	Virginia pine, black oak, chestnut oak, shortleaf pine
	chestnut oak	55	50	38	
	Virginia pine	60	50	86	
GpF:					
Gilpin	black oak	60	50	43	black oak, northern red oak, white oak, yellow-poplar
	northern red oak	80	50	57	
	white oak	75	50	57	
	yellow-poplar	90	50	100	
Petros	black oak	60	50	43	Virginia pine, black oak, chestnut oak, shortleaf pine
	chestnut oak	55	50	38	
	Virginia pine	60	50	86	
GsB:					
Gilpin	black oak	80	50	57	Virginia pine, eastern white pine, northern red oak, shortleaf pine, yellow-poplar
	chestnut oak	80	50	57	
	northern red oak	80	50	57	
	scarlet oak	76	50	57	
	shortleaf pine	70	50	114	
	yellow-poplar	95	50	100	

Table 10.—Forest Productivity—Continued

Map unit symbol and soil name	Potential productivity				Trees to manage
	Characteristic trees	Site index	Site index base age	Volume of wood fiber (CMAI)	
		ft	yrs	cu ft/ac/yr	
GsB:					
Sequoia	loblolly pine	83	50	114	Virginia pine, loblolly pine, shortleaf pine
	northern red oak	70	50	57	
	shortleaf pine	63	50	100	
	Virginia pine	71	50	114	
GsC:					
Gilpin	black oak	80	50	57	Virginia pine, eastern white pine, northern red oak, shortleaf pine, yellow-poplar
	chestnut oak	80	50	57	
	northern red oak	80	50	57	
	scarlet oak	76	50	57	
	shortleaf pine	70	50	114	
	yellow-poplar	95	50	100	
Sequoia	loblolly pine	83	50	114	Virginia pine, loblolly pine, shortleaf pine
	northern red oak	70	50	57	
	shortleaf pine	63	50	100	
	Virginia pine	71	50	114	
GsD:					
Gilpin	black oak	80	50	57	Virginia pine, eastern white pine, northern red oak, shortleaf pine, yellow-poplar
	chestnut oak	80	50	57	
	northern red oak	80	50	57	
	scarlet oak	76	50	57	
	shortleaf pine	70	50	114	
	yellow-poplar	95	50	100	
Sequoia	loblolly pine	83	50	114	Virginia pine, loblolly pine, shortleaf pine
	northern red oak	70	50	57	
	shortleaf pine	63	50	100	
	Virginia pine	71	50	114	
ItE:					
Itmann, unstable fill	---	---		---	eastern white pine, shortleaf pine, black oak, black locust, red maple
LdB:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
LdC:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
LdD:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	

Table 10.—Forest Productivity—Continued

Map unit symbol and soil name	Potential productivity				Trees to manage
	Characteristic trees	Site index	Site index base age	Volume of wood fiber (CMAI)	
		ft	yrs	cu ft/ac/yr	
LgC:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
Gilpin	black oak	80	50	57	northern red oak, yellow-poplar
	chestnut oak	80	50	57	
	northern red oak	80	50	57	
	scarlet oak	76	50	57	
	shortleaf pine	70	50	114	
	yellow-poplar	95	50	100	
LgD:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
Gilpin	black oak	80	50	57	northern red oak, yellow-poplar
	chestnut oak	80	50	57	
	northern red oak	80	50	57	
	scarlet oak	76	50	57	
	shortleaf pine	70	50	114	
	yellow-poplar	95	50	100	
LgE:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
Gilpin	black oak	60	50	43	northern red oak, yellow-poplar
	northern red oak	80	50	57	
	white oak	75	50	57	
	yellow-poplar	90	50	100	
LmC:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
Ramsey	northern red oak	50	50	29	Virginia pine, northern red oak, shortleaf pine
	shortleaf pine	50	50	72	
	Virginia pine	50	50	77	
LmD:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
Ramsey	northern red oak	50	50	29	Virginia pine, northern red oak, shortleaf pine
	shortleaf pine	50	50	72	
	Virginia pine	50	50	77	

Table 10.—Forest Productivity—Continued

Map unit symbol and soil name	Potential productivity				Trees to manage
	Characteristic trees	Site index	Site index base age	Volume of wood fiber (CMAI)	
		ft	yrs	cu ft/ac/yr	
LmE:					
Lily	scarlet oak	77	50	43	Virginia pine, scarlet oak, shortleaf pine, white oak
	shortleaf pine	63	50	100	
	Virginia pine	80	50	114	
	white oak	73	50	57	
Ramsey	northern red oak	50	50	29	Virginia pine, northern red oak, shortleaf pine
	shortleaf pine	50	50	72	
	Virginia pine	50	50	77	
LoB:					
Lonewood	northern red oak	70	50	62	Virginia pine, northern red oak, shortleaf pine, white oak, yellow-poplar
	shortleaf pine	70	50	114	
	Virginia pine	70	50	114	
	white oak	70	50	57	
	yellow-poplar	90	50	90	
LoC:					
Lonewood	northern red oak	70	50	62	Virginia pine, northern red oak, shortleaf pine, white oak, yellow-poplar
	shortleaf pine	70	50	114	
	Virginia pine	70	50	114	
	white oak	70	50	57	
	yellow-poplar	90	50	95	
Ps:					
Pope, frequently flooded	American sycamore	75	35	81	American sycamore, northern red oak, sweetgum, white oak, yellow-poplar
	northern red oak	80	50	62	
	sweetgum	75	50	86	
	white oak	80	50	57	
	yellow-poplar	96	50	100	
Skidmore, frequently flooded	eastern white pine	90	50	172	eastern white pine, loblolly pine, yellow-poplar
	northern red oak	80	50	57	
	Virginia pine	80	50	114	
	yellow-poplar	95	50	100	
RaF:					
Ramsey	northern red oak	50	50	29	Virginia pine, northern red oak, shortleaf pine
	shortleaf pine	50	50	72	
	Virginia pine	50	50	77	
SaC:					
Shelocta	black oak	80	50	107	black oak, scarlet oak, white oak, yellow-poplar
	scarlet oak	80	50	43	
	white oak	70	50	57	
	yellow-poplar	100	50	57	
SaD:					
Shelocta	black oak	80	50	107	black oak, scarlet oak, white oak, yellow-poplar
	scarlet oak	80	50	43	
	white oak	70	50	57	
	yellow-poplar	100	50	57	
SaE:					
Shelocta	black oak	80	50	107	black oak, scarlet oak, white oak, yellow-poplar
	scarlet oak	80	50	43	
	white oak	70	50	57	
	yellow-poplar	100	50	57	

Table 10.—Forest Productivity—Continued

Map unit symbol and soil name	Potential productivity				Trees to manage
	Characteristic trees	Site index	Site index base age	Volume of wood fiber (CMAI)	
		ft	yrs	cu ft/ac/yr	
SbF:					
Shelocta, extremely stony	black oak	73	50	57	black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, yellow-poplar
	red maple	81	50	57	
	scarlet oak	80	50	43	
	shortleaf pine	77	50	129	
	white oak	77	50	57	
	yellow-poplar	99	50	100	
Bouldin, extremely stony	northern red oak	75	50	57	shortleaf pine, yellow-poplar
	shortleaf pine	55	50	90	
	Virginia pine	60	50	81	
	white oak	50	50	38	
	yellow-poplar	90	50	86	
Sk:					
Skidmore, frequently flooded	eastern white pine	90	35	172	American sycamore, sweetgum, yellow-poplar
	Virginia pine	80	50	114	
	yellow-poplar	103	50	114	
WnB:					
Wernock	black oak	71	50	57	black oak, chestnut oak, scarlet oak, shortleaf pine, white oak
	chestnut oak	71	50	57	
	scarlet oak	73	50	57	
	shortleaf pine	70	50	114	
	white oak	71	50	57	
WnC:					
Wernock	black oak	71	50	57	black oak, chestnut oak, scarlet oak, shortleaf pine, white oak
	chestnut oak	71	50	57	
	scarlet oak	73	50	57	
	shortleaf pine	70	50	114	
	white oak	71	50	57	

Table 11a.—Land Management - Hazard of Erosion and Suitability for Roads

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:							
Atkins, ponded	85	Slight		Slight		Poorly suited	
						Ponding	1.00
						Wetness	1.00
						Low strength	0.50
AyD:							
Atkins, occasionally flooded	66	Slight		Slight		Poorly suited	
						Wetness	1.00
						Flooding	0.50
						Low strength	0.50
Lily	30	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
Az:							
Atkins, frequently flooded	45	Slight		Slight		Poorly suited	
						Flooding	1.00
						Wetness	1.00
						Low strength	0.50
Skidmore, frequently flooded	40	Slight		Slight		Well suited	
GaC:							
Gilpin	89	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Low strength	0.50
						Slope	0.50
GaD:							
Gilpin	85	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
GbF:							
Gilpin, stony	45	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
Bouldin, very stony-	42	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Rock fragments	0.50
GdF:							
Gilpin, stony	35	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50

Table 11a.—Land Management - Hazard of Erosion and Suitability for Roads—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GdF:							
Bouldin, very stony-	30	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Rock fragments	0.50
Petros, stony-------	25	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
GpE:							
Gilpin--------------	55	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.50
Petros--------------	35	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.50
GpF:							
Gilpin--------------	55	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
Petros--------------	35	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
GsB:							
Gilpin--------------	63	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
Sequoia-------------	30	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
GsC:							
Gilpin--------------	63	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
Sequoia-------------	30	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
GsD:							
Gilpin--------------	55	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
Sequoia-------------	30	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10

Table 11a.—Land Management - Hazard of Erosion and Suitability for Roads—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ItE:							
Itmann, unstable fill	90	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Landslides	1.00
						Slope	1.00
LdB:							
Lily	90	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
LdC:							
Lily	83	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
LdD:							
Lily	85	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
LgC:							
Lily	50	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
Gilpin	40	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Low strength	0.50
						Slope	0.50
LgD:							
Lily	60	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.10
Gilpin	35	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
LgE:							
Lily	55	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.50
Gilpin	30	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.50
LmC:							
Lily	65	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
Ramsey	30	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50

Table 11a.—Land Management - Hazard of Erosion and Suitability for Roads—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LmD:							
Lily	60	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.10
Ramsey	35	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
LmE:							
Lily	60	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	0.50
Ramsey	35	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
LoB:							
Lonewood	80	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
LoC:							
Lonewood	90	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Low strength	0.50
						Slope	0.50
Ps:							
Pope, frequently flooded	55	Slight		Slight		Poorly suited	
						Flooding	1.00
Skidmore, frequently flooded	40	Slight		Slight		Poorly suited	
						Flooding	1.00
RaF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Ramsey	40	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
SaC:							
Shelocta	90	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Low strength	0.50
						Slope	0.50
SaD:							
Shelocta	90	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.50

Table 11a.—Land Management - Hazard of Erosion and Suitability for Roads—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SaE:							
Shelocta	90	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
SbF:							
Shelocta, extremely stony	45	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
Bouldin, extremely stony	25	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
Sk:							
Skidmore, frequently flooded	100	Slight		Slight		Poorly suited	
						Flooding	1.00
W:							
Water	100	Not rated		Not rated		Not rated	
WnB:							
Wernock	92	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
WnC:							
Wernock	92	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Low strength	0.50
						Slope	0.50

Table 11b.—Land Management - Planting

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:							
Atkins, ponded	85	Poorly suited		Poorly suited		Severe	
		Wetness	0.75	Wetness	0.75	Low strength	1.00
						Wetness	0.50
AyD:							
Atkins, occasionally flooded	66	Well suited		Well suited		Severe	
						Low strength	1.00
Lily	30	Well suited		Poorly suited		Severe	
				Slope	0.75	Low strength	1.00
Az:							
Atkins, frequently flooded	45	Well suited		Well suited		Severe	
						Low strength	1.00
Skidmore, frequently flooded	40	Moderately suited		Unsuited		Moderate	
		Rock fragments	0.50	Rock fragments	1.00	Low strength	0.50
GaC:							
Gilpin	89	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	1.00
				Stickiness; high plasticity index	0.50		
GaD:							
Gilpin	85	Moderately suited		Poorly suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	1.00
				Stickiness; high plasticity index	0.50		
GbF:							
Gilpin, stony	45	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50		
Bouldin, very stony-	42	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
		Rock fragments	0.50	Rock fragments	0.75		
GdF:							
Gilpin, stony	35	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50		
Bouldin, very stony-	30	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
		Rock fragments	0.50	Rock fragments	0.75		

Table 11b.—Land Management - Planting—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GdF:							
Petros, stony	25	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.50		
GpE:							
Gilpin	55	Moderately suited		Unsuited		Severe	
		Stickiness; high plasticity index	0.50	Slope	1.00	Low strength	1.00
				Stickiness; high plasticity index	0.50		
Petros	35	Moderately suited		Unsuited		Severe	
		Rock fragments	0.50	Slope	1.00	Low strength	1.00
				Rock fragments	0.50		
GpF:							
Gilpin	55	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50		
Petros	35	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.50		
GsB:							
Gilpin	63	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	1.00
Sequoia	30	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	1.00
GsC:							
Gilpin	63	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	1.00
				Stickiness; high plasticity index	0.50		
Sequoia	30	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Stickiness; high plasticity index	0.50	Low strength	1.00
				Slope	0.50		
GsD:							
Gilpin	55	Moderately suited		Poorly suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	1.00
				Stickiness; high plasticity index	0.50		
Sequoia	30	Moderately suited		Poorly suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	1.00
				Stickiness; high plasticity index	0.50		
ItE:							
Itmann, unstable fill	90	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
		Rock fragments	0.50	Rock fragments	0.50		

Table 11b.—Land Management - Planting—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LdB:							
Lily	90	Well suited		Well suited		Severe	
						Low strength	1.00
LdC:							
Lily	83	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
LdD:							
Lily	85	Well suited		Poorly suited		Severe	
				Slope	0.75	Low strength	1.00
LgC:							
Lily	50	Well suited		Moderately suited		Moderate	
				Slope	0.50	Low strength	0.50
Gilpin	40	Moderately suited		Moderately suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.50	Low strength	1.00
				Stickiness; high plasticity index	0.50		
LgD:							
Lily	60	Well suited		Poorly suited		Moderate	
				Slope	0.75	Low strength	0.50
Gilpin	35	Moderately suited		Poorly suited		Severe	
		Stickiness; high plasticity index	0.50	Slope	0.75	Low strength	1.00
				Stickiness; high plasticity index	0.50		
LgE:							
Lily	55	Well suited		Unsuited		Moderate	
				Slope	1.00	Low strength	0.50
Gilpin	30	Moderately suited		Unsuited		Severe	
		Stickiness; high plasticity index	0.50	Slope	1.00	Low strength	1.00
				Stickiness; high plasticity index	0.50		
LmC:							
Lily	65	Well suited		Moderately suited		Moderate	
				Slope	0.50	Low strength	0.50
Ramsey	30	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
LmD:							
Lily	60	Well suited		Poorly suited		Moderate	
				Slope	0.75	Low strength	0.50
Ramsey	35	Well suited		Poorly suited		Severe	
				Slope	0.75	Low strength	1.00
LmE:							
Lily	60	Well suited		Unsuited		Moderate	
				Slope	1.00	Low strength	0.50
Ramsey	35	Well suited		Unsuited		Severe	
				Slope	1.00	Low strength	1.00

Table 11b.—Land Management - Planting—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LoB:							
Lonewood	80	Well suited		Well suited		Severe Low strength	1.00
LoC:							
Lonewood	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
Ps:							
Pope, frequently flooded	55	Well suited		Well suited		Moderate Low strength	0.50
Skidmore, frequently flooded	40	Moderately suited Rock fragments	0.50	Unsuited Rock fragments	1.00	Moderate Low strength	0.50
RaF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Ramsey	40	Moderately suited Slope	0.50	Unsuited Slope	1.00	Severe Low strength	1.00
SaC:							
Shelocta	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
SaD:							
Shelocta	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
SaE:							
Shelocta	90	Well suited		Unsuited Slope	1.00	Severe Low strength	1.00
SbF:							
Shelocta, extremely stony	45	Moderately suited Rock fragments Slope	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Severe Low strength	1.00
Bouldin, extremely stony	25	Moderately suited Rock fragments Slope	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Slight Strength	0.10
Sk:							
Skidmore, frequently flooded	100	Moderately suited Rock fragments	0.50	Unsuited Rock fragments	1.00	Moderate Low strength	0.50
W:							
Water	100	Not rated		Not rated		Not rated	
WnB:							
Wernock	92	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Severe Low strength	1.00

Table 11b.—Land Management - Planting—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WnC:							
Wernock----------	92	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Slope Stickiness; high plasticity index	0.50 0.50	Severe Low strength	1.00

Table 11c.—Land Management - Site Preparation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitabilty for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:					
Atkins, ponded	85	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.75
AyD:					
Atkins, occasionally flooded	66	Well suited		Well suited	
Lily	30	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Restrictive layer	0.50		
Az:					
Atkins, frequently flooded	45	Well suited		Well suited	
Skidmore, frequently flooded	40	Well suited		Poorly suited	
				Rock fragments	0.50
GaC:					
Gilpin	89	Well suited		Well suited	
GaD:					
Gilpin	85	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
GbF:					
Gilpin, stony	45	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
Bouldin, very stony-	42	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
GdF:					
Gilpin, stony	35	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
Bouldin, very stony-	30	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
Petros, stony	25	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
GpE:					
Gilpin	55	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
Petros	35	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
				Rock fragments	0.50

Table 11c.—Land Management - Site Preparation—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GpF:					
Gilpin	55	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
Petros	35	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
GsB:					
Gilpin	63	Well suited		Well suited	
Sequoia	30	Well suited		Well suited	
GsC:					
Gilpin	63	Well suited		Well suited	
Sequoia	30	Well suited		Well suited	
GsD:					
Gilpin	55	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
Sequoia	30	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
ItE:					
Itmann, unstable fill	90	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
				Rock fragments	0.50
LdB:					
Lily	90	Poorly suited		Well suited	
		Restrictive layer	0.50		
LdC:					
Lily	83	Poorly suited		Well suited	
		Restrictive layer	0.50		
LdD:					
Lily	85	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Restrictive layer	0.50		
LgC:					
Lily	50	Poorly suited		Well suited	
		Restrictive layer	0.50		
Gilpin	40	Well suited		Well suited	
LgD:					
Lily	60	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Restrictive layer	0.50		
Gilpin	35	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50

Table 11c.—Land Management - Site Preparation—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LgE:					
Lily	55	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Restrictive layer	0.50		
Gilpin	30	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
LmC:					
Lily	65	Poorly suited		Well suited	
		Restrictive layer	0.50		
Ramsey	30	Unsuited		Well suited	
		Restrictive layer	1.00		
LmD:					
Lily	60	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Restrictive layer	0.50		
Ramsey	35	Unsuited		Poorly suited	
		Restrictive layer	1.00	Slope	0.50
		Slope	0.50		
LmE:					
Lily	60	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Restrictive layer	0.50		
Ramsey	35	Unsuited		Poorly suited	
		Restrictive layer	1.00	Slope	0.50
		Slope	0.50		
LoB:					
Lonewood	80	Well suited		Well suited	
LoC:					
Lonewood	90	Well suited		Well suited	
Ps:					
Pope, frequently flooded	55	Well suited		Well suited	
Skidmore, frequently flooded	40	Well suited		Poorly suited	
				Rock fragments	0.50
RaF:					
Rock outcrop	60	Not rated		Not rated	
Ramsey	40	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
		Restrictive layer	1.00		
SaC:					
Shelocta	90	Well suited		Well suited	
SaD:					
Shelocta	90	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50

Table 11c.—Land Management - Site Preparation—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SaE:					
Shelocta	90	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
SbF:					
Shelocta, extremely stony	45	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
Bouldin, extremely stony	25	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
Sk:					
Skidmore, frequently flooded	100	Well suited		Poorly suited	
				Rock fragments	0.50
W:					
Water	100	Not rated		Not rated	
WnB:					
Wernock	92	Well suited		Well suited	
WnC:					
Wernock	92	Well suited		Well suited	

Table 11d.—Land Management - Site Restoration

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential windthrow hazard		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:							
Atkins, ponded	85	Low Texture/rock fragments	0.10	High Depth to saturated zone	1.00	High Wetness	1.00
AyD:							
Atkins, occasionally flooded	66	Low Texture/rock fragments	0.10	High Depth to saturated zone	1.00	High Wetness	1.00
Lily	30	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Az:							
Atkins, frequently flooded	45	Low Texture/rock fragments	0.10	High Depth to saturated zone	1.00	High Wetness	1.00
Skidmore, frequently flooded	40	Low		Low		Low	
GaC:							
Gilpin	89	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
GaD:							
Gilpin	85	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
GbF:							
Gilpin, stony	45	Low		Moderate Rooting depth limitation	0.50	Low	
Bouldin, very stony-	42	Moderate Texture/slope/ rock fragments	0.50	Low		Low	
GdF:							
Gilpin, stony	35	Low		Moderate Rooting depth limitation	0.50	Low	
Bouldin, very stony-	30	Moderate Texture/slope/ rock fragments	0.50	Low		Low	

Table 11d.—Land Management - Site Restoration—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential windthrow hazard		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GdF:							
Petros, stony-------	25	High Texture/slope/ surface depth/ rock fragments	1.00	High Rooting depth limitation	1.00	Low	
GpE:							
Gilpin--------------	55	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Petros--------------	35	Low		High Rooting depth limitation	1.00	Low	
GpF:							
Gilpin--------------	55	Low		Moderate Rooting depth limitation	0.50	Low	
Petros--------------	35	High Texture/slope/ surface depth/ rock fragments	1.00	High Rooting depth limitation	1.00	Low	
GsB:							
Gilpin--------------	63	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Sequoia-------------	30	Moderate Texture/rock fragments	0.50	Moderate Rooting depth limitation	0.50	Low	
GsC:							
Gilpin--------------	63	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Sequoia-------------	30	Moderate Texture/rock fragments	0.50	Moderate Rooting depth limitation	0.50	Low	
GsD:							
Gilpin--------------	55	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Sequoia-------------	30	Moderate Texture/rock fragments	0.50	Moderate Rooting depth limitation	0.50	Low	
ItE:							
Itmann, unstable fill----------	90	High Texture/slope/ surface depth/ rock fragments	1.00	Low		High Soil reaction	1.00

Table 11d.—Land Management - Site Restoration—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential windthrow hazard		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LdB:							
Lily	90	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
LdC:							
Lily	83	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
LdD:							
Lily	85	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
LgC:							
Lily	50	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Gilpin	40	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
LgD:							
Lily	60	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Gilpin	35	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
LgE:							
Lily	55	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Gilpin	30	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
LmC:							
Lily	65	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Ramsey	30	Low		High Rooting depth limitation	1.00	Low	
LmD:							
Lily	60	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Ramsey	35	Low		High Rooting depth limitation	1.00	Low	

Table 11d.—Land Management - Site Restoration—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential windthrow hazard		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LmE:							
Lily	60	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
Ramsey	35	Low		High Rooting depth limitation	1.00	Low	
LoB:							
Lonewood	80	Low Texture/rock fragments	0.10	Low		Low	
LoC:							
Lonewood	90	Low Texture/rock fragments	0.10	Low		Low	
Ps:							
Pope, frequently flooded	55	Low		Low		Low	
Skidmore, frequently flooded	40	Low		Low		Low	
RaF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Ramsey	40	High Texture/slope/ surface depth/ rock fragments	1.00	High Rooting depth limitation	1.00	Low	
SaC:							
Shelocta	90	Low Texture/rock fragments	0.10	Low		Low	
SaD:							
Shelocta	90	Low Texture/rock fragments	0.10	Low		Low	
SaE:							
Shelocta	90	Low Texture/rock fragments	0.10	Low		Low	
SbF:							
Shelocta, extremely stony	45	Low Texture/rock fragments	0.10	Low		Low	
Bouldin, extremely stony	25	Moderate Texture/slope/ rock fragments	0.50	Low		Low	

Table 11d.—Land Management - Site Restoration—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential windthrow hazard		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Sk:							
Skidmore, frequently flooded	100	Low		Low		Low	
W:							
Water	100	Not rated		Not rated		Not rated	
WnB:							
Wernock	92	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	
WnC:							
Wernock	92	Low Texture/rock fragments	0.10	Moderate Rooting depth limitation	0.50	Low	

Table 12a.—Camp and Picnic Areas

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:					
Atkins, ponded	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
AyD:					
Atkins, occasionally flooded	66	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00		
Lily	30	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
Az:					
Atkins, frequently flooded	45	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Flooding	0.40
Skidmore, frequently flooded	40	Very limited		Not limited	
		Flooding	1.00		
GaC:					
Gilpin	89	Somewhat limited		Somewhat limited	
		Slope	0.04	Slope	0.04
GaD:					
Gilpin	85	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
GbF:					
Gilpin, stony	45	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
Bouldin, very stony-	42	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.83	Large stones content	0.83
GdF:					
Gilpin, stony	35	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
Bouldin, very stony-	30	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.83	Large stones content	0.83

Table 12a.—Camp and Picnic Areas—Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GdF:					
Petros, stony	25	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Gravel	0.16	Gravel	0.16
GpE:					
Gilpin	55	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
Petros	35	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Gravel	0.16	Gravel	0.16
GpF:					
Gilpin	55	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
Petros	35	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Gravel	0.16	Gravel	0.16
GsB:					
Gilpin	63	Not limited		Not limited	
Sequoia	30	Somewhat limited		Somewhat limited	
		Slow water movement	0.21	Slow water movement	0.21
GsC:					
Gilpin	63	Somewhat limited		Somewhat limited	
		Slope	0.01	Slope	0.01
Sequoia	30	Somewhat limited		Somewhat limited	
		Slow water movement	0.21	Slow water movement	0.21
		Slope	0.01	Slope	0.01
GsD:					
Gilpin	55	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
Sequoia	30	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Slow water movement	0.21	Slow water movement	0.21
ItE:					
Itmann, unstable fill	90	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Too acid	1.00	Too acid	1.00
		Gravel	0.50	Gravel	0.50
LdB:					
Lily	90	Not limited		Not limited	

Table 12a.—Camp and Picnic Areas—Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LdC:					
Lily	83	Somewhat limited		Somewhat limited	
		Slope	0.01	Slope	0.01
LdD:					
Lily	85	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
LgC:					
Lily	50	Somewhat limited		Somewhat limited	
		Slope	0.04	Slope	0.04
		Too sandy	0.03	Too sandy	0.03
Gilpin	40	Somewhat limited		Somewhat limited	
		Slope	0.04	Slope	0.04
LgD:					
Lily	60	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Too sandy	0.03	Too sandy	0.03
Gilpin	35	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
LgE:					
Lily	55	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Too sandy	0.03	Too sandy	0.03
Gilpin	30	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
LmC:					
Lily	65	Somewhat limited		Somewhat limited	
		Slope	0.04	Slope	0.04
		Too sandy	0.03	Too sandy	0.03
Ramsey	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.04	Slope	0.04
LmD:					
Lily	60	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Too sandy	0.03	Too sandy	0.03
Ramsey	35	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
LmE:					
Lily	60	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Too sandy	0.03	Too sandy	0.03
Ramsey	35	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00

Table 12a.—Camp and Picnic Areas—Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LoB:					
Lonewood	80	Not limited		Not limited	
LoC:					
Lonewood	90	Somewhat limited		Somewhat limited	
		Slope	0.04	Slope	0.04
Ps:					
Pope, frequently flooded	55	Very limited		Somewhat limited	
		Flooding	1.00	Too sandy	0.60
		Too sandy	0.60	Flooding	0.40
Skidmore, frequently flooded	40	Very limited		Somewhat limited	
		Flooding	1.00	Flooding	0.40
RaF:					
Rock outcrop	60	Not rated		Not rated	
Ramsey	40	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
SaC:					
Shelocta	90	Somewhat limited		Somewhat limited	
		Slope	0.04	Slope	0.04
SaD:					
Shelocta	90	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
SaE:					
Shelocta	90	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
SbF:					
Shelocta, extremely stony	45	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
Bouldin, extremely stony	25	Very limited		Very limited	
		Too steep	1.00	Too steep	1.00
		Large stones content	0.35	Large stones content	0.35
Sk:					
Skidmore, frequently flooded	100	Very limited		Somewhat limited	
		Flooding	1.00	Flooding	0.40
W:					
Water	100	Not rated		Not rated	
WnB:					
Wernock	92	Not limited		Not limited	
WnC:					
Wernock	92	Somewhat limited		Somewhat limited	
		Slope	0.01	Slope	0.01

Table 12b.—Trail Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:					
Atkins, ponded	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Ponding	1.00	Ponding	1.00
AyD:					
Atkins, occasionally flooded	66	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
Lily	30	Somewhat limited		Not limited	
		Slope	0.02		
Az:					
Atkins, frequently flooded	45	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.40	Flooding	0.40
Skidmore, frequently flooded	40	Not limited		Not limited	
GaC:					
Gilpin	89	Not limited		Not limited	
GaD:					
Gilpin	85	Somewhat limited		Not limited	
		Slope	0.02		
GbF:					
Gilpin, stony	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00
Bouldin, very stony	42	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.83	Large stones content	0.83
GdF:					
Gilpin, stony	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
Bouldin, very stony	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.83	Large stones content	0.83
Petros, stony	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
GpE:					
Gilpin	55	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08
Petros	35	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08

Table 12b.—Trail Management—Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GpF:					
Gilpin	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
Petros	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
GsB:					
Gilpin	63	Not limited		Not limited	
Sequoia	30	Not limited		Not limited	
GsC:					
Gilpin	63	Not limited		Not limited	
Sequoia	30	Not limited		Not limited	
GsD:					
Gilpin	55	Somewhat limited		Not limited	
		Slope	0.18		
Sequoia	30	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Slope	0.18		
ItE:					
Itmann, unstable fill	90	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.78
LdB:					
Lily	90	Not limited		Not limited	
LdC:					
Lily	83	Not limited		Not limited	
LdD:					
Lily	85	Somewhat limited		Not limited	
		Slope	0.02		
LgC:					
Lily	50	Somewhat limited		Somewhat limited	
		Too sandy	0.03	Too sandy	0.03
Gilpin	40	Not limited		Not limited	
LgD:					
Lily	60	Somewhat limited		Somewhat limited	
		Too sandy	0.03	Too sandy	0.03
		Slope	0.02		
Gilpin	35	Somewhat limited		Not limited	
		Slope	0.02		
LgE:					
Lily	55	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08
		Too sandy	0.03	Too sandy	0.03
Gilpin	30	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08

Table 12b.—Trail Management—Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LmC:					
Lily	65	Somewhat limited		Somewhat limited	
		Too sandy	0.03	Too sandy	0.03
Ramsey	30	Not limited		Not limited	
LmD:					
Lily	60	Somewhat limited		Somewhat limited	
		Too sandy	0.03	Too sandy	0.03
		Slope	0.02		
Ramsey	35	Somewhat limited		Not limited	
		Slope	0.02		
LmE:					
Lily	60	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08
		Too sandy	0.03	Too sandy	0.03
Ramsey	35	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08
LoB:					
Lonewood	80	Not limited		Not limited	
LoC:					
Lonewood	90	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
Ps:					
Pope, frequently flooded	55	Somewhat limited		Somewhat limited	
		Too sandy	0.60	Too sandy	0.60
		Flooding	0.40	Flooding	0.40
Skidmore, frequently flooded	40	Somewhat limited		Somewhat limited	
		Flooding	0.40	Flooding	0.40
RaF:					
Rock outcrop	60	Not rated		Not rated	
Ramsey	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
SaC:					
Shelocta	90	Not limited		Not limited	
SaD:					
Shelocta	90	Not limited		Not limited	
SaE:					
Shelocta	90	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08
SbF:					
Shelocta, extremely stony	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00

Table 12b.—Trail Management—Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SbF:					
Bouldin, extremely stony	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.35	Large stones content	0.35
Sk:					
Skidmore, frequently flooded	100	Somewhat limited		Somewhat limited	
		Flooding	0.40	Flooding	0.40
W:					
Water	100	Not rated		Not rated	
WnB:					
Wernock	92	Not limited		Not limited	
WnC:					
Wernock	92	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00

Table 13a.—Dwelllings and Small Commercial Buildings

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:							
Atkins, ponded	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
AyD:							
Atkins, occasionally flooded	66	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Lily	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to hard bedrock	0.46
Az:							
Atkins, frequently flooded	45	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Skidmore, frequently flooded	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Large stones	1.00	Large stones	1.00	Large stones	1.00
GaC:							
Gilpin	89	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Depth to soft bedrock	0.20	Slope	1.00
				Slope	0.04		
GaD:							
Gilpin	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		
GbF:							
Gilpin, stony	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		
Bouldin, very stony	42	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Large stones	0.97	Large stones	0.97	Large stones	0.97

Table 13a.—Dwelllings and Small Commercial Buildings—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GdF:							
Gilpin, stony-------	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		
Bouldin, very stony-	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Large stones	0.97	Large stones	0.97	Large stones	0.97
Petros, stony-------	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
GpE:							
Gilpin--------------	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		
Petros--------------	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
GpF:							
Gilpin--------------	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		
Petros--------------	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
GsB:							
Gilpin--------------	63	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.20		
Sequoia-------------	30	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
				Depth to soft bedrock	0.15		
GsC:							
Gilpin--------------	63	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Depth to soft bedrock	0.20	Slope	1.00
				Slope	0.01		
Sequoia-------------	30	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.01	Depth to soft bedrock	0.15	Shrink-swell	0.50
				Slope	0.01		

Table 13a.—Dwelllings and Small Commercial Buildings—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsD:							
Gilpin	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		
Sequoia	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
				Depth to soft bedrock	0.15		
ItE:							
Itmann, unstable fill	90	Very limited		Very limited		Very limited	
		Unstable fill	1.00	Unstable fill	1.00	Unstable fill	1.00
		Too steep	1.00	Too steep	1.00	Slope	1.00
LdB:							
Lily	90	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to hard bedrock	0.46
LdC:							
Lily	83	Somewhat limited		Very limited		Very limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Slope	1.00
		Slope	0.01	Slope	0.01	Depth to hard bedrock	0.46
LdD:							
Lily	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to hard bedrock	0.46
LgC:							
Lily	50	Somewhat limited		Very limited		Very limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Slope	1.00
		Slope	0.04	Slope	0.04	Depth to hard bedrock	0.46
Gilpin	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Depth to soft bedrock	0.20	Slope	1.00
				Slope	0.04		
LgD:							
Lily	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to hard bedrock	0.46
Gilpin	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		

Table 13a.—Dwelllings and Small Commercial Buildings—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgE:							
Lily	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to hard bedrock	0.46
Gilpin	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
				Depth to soft bedrock	0.20		
LmC:							
Lily	65	Somewhat limited		Very limited		Very limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Slope	1.00
		Slope	0.04	Slope	0.04	Depth to hard bedrock	0.46
Ramsey	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	0.04	Slope	0.04	Slope	1.00
LmD:							
Lily	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to hard bedrock	0.46
Ramsey	35	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Too steep	1.00	Too steep	1.00	Depth to hard bedrock	1.00
LmE:							
Lily	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to hard bedrock	0.46
Ramsey	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
LoB:							
Lonewood	80	Not limited		Not limited		Not limited	
LoC:							
Lonewood	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Slope	0.04	Slope	1.00
Ps:							
Pope, frequently flooded	55	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.03		

Table 13a.—Dwelllings and Small Commercial Buildings—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ps:							
Skidmore, frequently flooded	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Large stones	1.00	Large stones	1.00	Large stones	1.00
RaF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Ramsey	40	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
SaC:							
Shelocta	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Slope	0.04	Slope	1.00
SaD:							
Shelocta	90	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
SaE:							
Shelocta	90	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
SbF:							
Shelocta, extremely stony	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Bouldin, extremely stony	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Large stones	0.97	Large stones	0.97	Large stones	0.97
Sk:							
Skidmore, frequently flooded	100	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Large stones	1.00	Large stones	1.00	Large stones	1.00
				Depth to saturated zone	0.35		
W:							
Water	100	Not rated		Not rated		Not rated	
WnB:							
Wernock	92	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.10		
WnC:							
Wernock	92	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Depth to soft bedrock	0.10	Slope	1.00
				Slope	0.01		

Table 13b.—Roads and Streets, Shallow Excavations, and Landscaping

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:							
Atkins, ponded	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Low strength	1.00	Cutbanks cave	0.10		
AyD:							
Atkins, occasionally flooded	66	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	1.00	Cutbanks cave	0.10		
Lily	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Az:							
Atkins, frequently flooded	45	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Flooding	1.00
		Flooding	1.00	Flooding	0.80	Depth to saturated zone	1.00
		Low strength	1.00	Cutbanks cave	0.10		
Skidmore, frequently flooded	40	Very limited		Very limited		Somewhat limited	
		Large stones	1.00	Cutbanks cave	1.00	Large stones	0.92
		Flooding	0.40	Large stones	1.00	Droughty	0.15
GaC:							
Gilpin	89	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
		Slope	0.04	Cutbanks cave	0.10	Slope	0.04
				Slope	0.04		
GaD:							
Gilpin	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
GbF:							
Gilpin, stony	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		

Table 13b.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GbF:							
Bouldin, very stony-	42	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Large stones	0.97	Large stones	0.97	Large stones	1.00
				Cutbanks cave	0.10	Droughty	0.34
GdF:							
Gilpin, stony-------	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
Bouldin, very stony-	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Large stones	0.97	Large stones	0.97	Large stones	1.00
				Cutbanks cave	0.10	Droughty	0.34
Petros, stony-------	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00	Too steep	1.00
		Depth to soft bedrock	1.00			Droughty	1.00
				Too steep	1.00	Depth to bedrock	1.00
				Cutbanks cave	0.10	Gravel	0.16
GpE:							
Gilpin----------	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
Petros----------	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00	Too steep	1.00
		Depth to soft bedrock	1.00			Droughty	1.00
				Too steep	1.00	Depth to bedrock	1.00
				Cutbanks cave	0.10	Gravel	0.16
GpF:							
Gilpin----------	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
Petros----------	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00	Too steep	1.00
		Depth to soft bedrock	1.00			Droughty	1.00
				Too steep	1.00	Depth to bedrock	1.00
				Cutbanks cave	0.10	Gravel	0.16
GsB:							
Gilpin----------	63	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
Sequoia----------	30	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Too clayey	0.27	Depth to bedrock	0.16
		Shrink-swell	0.50	Depth to soft bedrock	0.15		
				Cutbanks cave	0.10		

Table 13b.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsC:							
Gilpin	63	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
		Slope	0.01	Cutbanks cave	0.10	Slope	0.01
				Slope	0.01		
Sequoia	30	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Too clayey	0.27	Depth to bedrock	0.16
		Shrink-swell	0.50	Depth to soft bedrock	0.15	Slope	0.01
		Slope	0.01	Cutbanks cave	0.10		
				Slope	0.01		
GsD:							
Gilpin	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
Sequoia	30	Very limited		Very limited		Very limited	
		Low strength	1.00	Too steep	1.00	Too steep	1.00
		Too steep	1.00	Too clayey	0.27	Depth to bedrock	0.16
		Shrink-swell	0.50	Depth to soft bedrock	0.15		
				Cutbanks cave	0.10		
ItE:							
Itmann, unstable fill	90	Very limited		Very limited		Very limited	
		Unstable fill	1.00	Too steep	1.00	Too steep	1.00
		Too steep	1.00	Cutbanks cave	0.10	Too acid	1.00
						Gravel	0.50
						Droughty	0.09
						Large stones	0.01
LdB:							
Lily	90	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
				Cutbanks cave	0.10		
LdC:							
Lily	83	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
		Slope	0.01	Cutbanks cave	0.10	Slope	0.01
				Slope	0.01		
LdD:							
Lily	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to bedrock	0.46
				Cutbanks cave	0.10		

Table 13b.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgC:							
Lily	50	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
		Slope	0.04	Cutbanks cave	0.10	Slope	0.04
				Slope	0.04		
Gilpin	40	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
		Slope	0.04	Cutbanks cave	0.10	Slope	0.04
				Slope	0.04		
LgD:							
Lily	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Gilpin	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
LgE:							
Lily	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Gilpin	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Depth to soft bedrock	0.20	Depth to bedrock	0.20
				Cutbanks cave	0.10		
LmC:							
Lily	65	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
		Slope	0.04	Cutbanks cave	0.10	Slope	0.04
				Slope	0.04		
Ramsey	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
		Slope	0.04	Cutbanks cave	0.10	Droughty	1.00
				Slope	0.04	Slope	0.04
LmD:							
Lily	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Depth to hard bedrock	0.46	Too steep	1.00	Depth to bedrock	0.46
				Cutbanks cave	0.10		

Table 13b.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LmD:							
Ramsey	35	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
						Droughty	1.00
		Too steep	1.00	Too steep	1.00	Too steep	1.00
				Cutbanks cave	0.10		
LmE:							
Lily	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00	Too steep	1.00
		Depth to hard bedrock	0.46			Depth to bedrock	0.46
				Too steep	1.00		
				Cutbanks cave	0.10		
Ramsey	35	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Too steep	1.00
						Depth to bedrock	1.00
		Too steep	1.00	Too steep	1.00	Droughty	1.00
				Cutbanks cave	0.10		
LoB:							
Lonewood	80	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
LoC:							
Lonewood	90	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	0.10	Slope	0.04
		Slope	0.04	Slope	0.04		
Ps:							
Pope, frequently flooded	55	Very limited		Very limited		Very limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	1.00
				Flooding	0.80		
				Depth to saturated zone	0.03		
Skidmore, frequently flooded	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	1.00
		Large stones	1.00	Large stones	1.00	Large stones	0.92
				Flooding	0.80	Droughty	0.15
RaF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Ramsey	40	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Too steep	1.00
						Depth to bedrock	1.00
		Too steep	1.00	Too steep	1.00	Droughty	1.00
				Cutbanks cave	0.10		
SaC:							
Shelocta	90	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	0.10	Slope	0.04
		Slope	0.04	Slope	0.04		
SaD:							
Shelocta	90	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Cutbanks cave	0.10		

Table 13b.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SaE:							
Shelocta	90	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Cutbanks cave	0.10		
SbF:							
Shelocta, extremely stony	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Low strength	1.00	Cutbanks cave	0.10		
Bouldin, extremely stony	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Too steep	1.00
		Large stones	0.97	Large stones	0.97	Large stones	1.00
				Cutbanks cave	0.10	Droughty	0.34
Sk:							
Skidmore, frequently flooded	100	Very limited		Very limited		Very limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	1.00
		Large stones	1.00	Large stones	1.00	Large stones	0.92
				Flooding	0.80	Droughty	0.15
				Depth to saturated zone	0.35		
W:							
Water	100	Not rated		Not rated		Not rated	
WnB:							
Wernock	92	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	0.10	Depth to bedrock	0.10
				Depth to soft bedrock	0.10		
WnC:							
Wernock	92	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	0.10	Depth to bedrock	0.10
		Slope	0.01	Depth to soft bedrock	0.10	Slope	0.01
				Slope	0.01		

Table 14.—Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:					
Atkins, ponded	85	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.78		
AyD:					
Atkins, occasionally flooded	66	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.78		
Lily	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Az:					
Atkins, frequently flooded	45	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.78		
Skidmore, frequently flooded	40	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Large stones	1.00	Large stones	1.00
		Filtering capacity	1.00	Flooding	0.40
		Flooding	0.40		
GaC:					
Gilpin	89	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.50	Slope	1.00
		Slope	0.04	Seepage	0.53

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GaD:					
Gilpin	85	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.53
GbF:					
Gilpin, stony	45	Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.53
Bouldin, very stony-	42	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Large stones	0.97	Large stones	1.00
GdF:					
Gilpin, stony	35	Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.53
Bouldin, very stony-	30	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Large stones	0.97	Large stones	1.00
Petros, stony	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00		
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
GpE:					
Gilpin	55	Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.53
Petros	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00		
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
GpF:					
Gilpin	55	Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00		
		Slow water	0.50	Slope	1.00
				Seepage	0.53

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GpF:					
Petros	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00		
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
GsB:					
Gilpin	63	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.50	Seepage	0.53
				Slope	0.08
Sequoia	30	Very limited		Very limited	
		Slow water movement	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Seepage	0.53
				Slope	0.08
GsC:					
Gilpin	63	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.50	Slope	1.00
		Slope	0.01	Seepage	0.53
Sequoia	30	Very limited		Very limited	
		Slow water movement	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slope	0.01	Seepage	0.53
GsD:					
Gilpin	55	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.53
Sequoia	30	Very limited		Very limited	
		Slow water movement	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Too steep	1.00	Seepage	0.53
ItE:					
Itmann, unstable fill	90	Very limited		Very limited	
		Unstable fill	1.00	Seepage	1.00
		Filtering capacity	1.00	Slope	1.00
		Too steep	1.00		
		Seepage, bottom layer	1.00		

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LdB:					
Lily	90	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.32
LdC:					
Lily	83	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slope	0.01	Slope	1.00
LdD:					
Lily	85	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
LgC:					
Lily	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slope	0.04	Slope	1.00
Gilpin	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.50	Slope	1.00
		Slope	0.04	Seepage	0.53
LgD:					
Lily	60	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Gilpin	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.53
LgE:					
Lily	55	Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Gilpin	30	Very limited		Very limited	
		Too steep	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.53

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LmC:					
Lily	65	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slope	0.04	Slope	1.00
Ramsey	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slope	0.04	Slope	1.00
LmD:					
Lily	60	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Ramsey	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Too steep	1.00	Seepage	1.00
LmE:					
Lily	60	Very limited		Very limited	
		Too steep	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Ramsey	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
LoB:					
Lonewood	80	Somewhat limited		Somewhat limited	
		Slow water movement	0.46	Seepage	0.53
		Depth to bedrock	0.30	Slope	0.32
LoC:					
Lonewood	90	Somewhat limited		Very limited	
		Slow water movement	0.46	Slope	1.00
		Depth to bedrock	0.30	Seepage	0.53
		Slope	0.04		
Ps:					
Pope, frequently flooded	55	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to saturated zone	0.08		

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ps:					
Skidmore, frequently flooded	40	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Large stones	1.00
		Large stones	1.00	Slope	0.02
		Filtering capacity	1.00		
RaF:					
Rock outcrop	60	Not rated		Not rated	
Ramsey	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Too steep	1.00		
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
SaC:					
Shelocta	90	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slow water movement	0.46		
		Slope	0.04		
SaD:					
Shelocta	90	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.46		
SaE:					
Shelocta	90	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.46		
SbF:					
Shelocta, extremely stony	45	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.46		
Bouldin, extremely stony	25	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Large stones	0.97	Large stones	1.00

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Sk:					
Skidmore, frequently flooded	100	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Large stones	1.00
		Large stones	1.00	Depth to saturated zone	0.17
		Filtering capacity	1.00		
		Depth to saturated zone	0.84		
W:					
Water	100	Not rated		Not rated	
WnB:					
Wernock	92	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.46	Seepage	0.53
				Slope	0.18
WnC:					
Wernock	92	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.46	Slope	1.00
		Slope	0.01	Seepage	0.53

Table 15a.—Source of Gravel and Sand

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
Ak:					
Atkins, ponded	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AyD:					
Atkins, occasionally flooded	66	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Lily	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Az:					
Atkins, frequently flooded	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Skidmore, frequently flooded	40	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.10
		Thickest layer	0.00	Thickest layer	0.10
GaC:					
Gilpin	89	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GaD:					
Gilpin	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GbF:					
Gilpin, stony	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Bouldin, very stony	42	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GdF:					
Gilpin, stony	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15a.—Source of Gravel and Sand—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
GdF:					
Bouldin, very stony-	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Petros, stony-------	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GpE:					
Gilpin--------------	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Petros--------------	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GpF:					
Gilpin--------------	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Petros--------------	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GsB:					
Gilpin--------------	63	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Sequoia-------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GsC:					
Gilpin--------------	63	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Sequoia-------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GsD:					
Gilpin--------------	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Sequoia-------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ItE:					
Itmann, unstable fill---------------	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15a.—Source of Gravel and Sand—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
LdB:					
Lily	90	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
LdC:					
Lily	83	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
LdD:					
Lily	85	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
LgC:					
Lily	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Gilpin	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LgD:					
Lily	60	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Gilpin	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LgE:					
Lily	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Gilpin	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LmC:					
Lily	65	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.01
Ramsey	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.05
LmD:					
Lily	60	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.01
Ramsey	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.05

Table 15a.—Source of Gravel and Sand—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
LmE:					
Lily	60	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.01
Ramsey	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.05
LoB:					
Lonewood	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LoC:					
Lonewood	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Ps:					
Pope, frequently flooded	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.50
Skidmore, frequently flooded	40	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.10
		Thickest layer	0.00	Thickest layer	0.10
RaF:					
Rock outcrop	60	Not rated		Not rated	
Ramsey	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.05
SaC:					
Shelocta	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SaD:					
Shelocta	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SaE:					
Shelocta	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SbF:					
Shelocta, extremely stony	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15a.—Source of Gravel and Sand—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
SbF:					
Bouldin, extremely stony	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Sk:					
Skidmore, frequently flooded	100	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.10
		Thickest layer	0.00	Thickest layer	0.10
W:					
Water	100	Not rated		Not rated	
WnB:					
Wernock	92	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
WnC:					
Wernock	92	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15b.—Source of Reclamation Material, Roadfill, and Topsoil

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:							
Atkins, ponded	85	Fair		Poor		Poor	
		Too acid	0.20	Wetness depth	0.00	Wetness depth	0.00
		Organic matter content low	0.50	Low strength	0.00	Too acid	0.76
AyD:							
Atkins, occasionally flooded	66	Fair		Poor		Poor	
		Too acid	0.20	Wetness depth	0.00	Wetness depth	0.00
		Organic matter content low	0.50	Low strength	0.00	Too acid	0.76
Lily	30	Fair		Poor		Poor	
		Droughty	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.98	Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59
Az:							
Atkins, frequently flooded	45	Fair		Poor		Poor	
		Too acid	0.20	Wetness depth	0.00	Wetness depth	0.00
		Organic matter content low	0.50	Low strength	0.00	Too acid	0.76
Skidmore, frequently flooded	40	Poor		Poor		Poor	
		Stone content	0.00	Stones	0.00	Rock fragments	0.00
		Too sandy	0.04	Cobble content	0.03	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12			Too sandy	0.04
		Cobble content	0.89				
		Too acid	0.92				
		Droughty	0.99				
GaC:							
Gilpin	89	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Too acid	0.76
		Droughty	0.75	Low strength	0.00	Depth to bedrock	0.79
		Depth to bedrock	0.79			Rock fragments	0.88
		Organic matter content low	0.88			Slope	0.96
GaD:							
Gilpin	85	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.75	Low strength	0.00	Too acid	0.76
		Depth to bedrock	0.79	Slope	0.98	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88

Table 15b.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GbF:							
Gilpin, stony-------	45	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.75	Slope	0.00	Too acid	0.76
		Depth to bedrock	0.79	Low strength	0.00	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88
Bouldin, very stony-	42	Poor		Poor		Poor	
		Stone content	0.00	Stones	0.00	Slope	0.00
		Organic matter content low	0.12	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Too acid	0.50	Cobble content	0.77	Rock fragments	0.32
						Too acid	0.92
GdF:							
Gilpin, stony-------	35	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Droughty	0.75	Depth to bedrock	0.00	Too acid	0.76
		Depth to bedrock	0.79	Low strength	0.00	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88
Bouldin, very stony-	30	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.12	Stones	0.00	Hard to reclaim (rock fragments)	0.00
		Too acid	0.50	Cobble content	0.77	Rock fragments	0.32
						Too acid	0.92
Petros, stony-------	25	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Rock fragments	0.00
		Organic matter content low	0.12			Depth to bedrock	0.00
		Too acid	0.54			Too acid	0.98
GpE:							
Gilpin--------------	55	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.75	Slope	0.00	Too acid	0.76
		Depth to bedrock	0.79	Low strength	0.00	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88
Petros--------------	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Rock fragments	0.00
		Organic matter content low	0.12			Depth to bedrock	0.00
		Too acid	0.54			Too acid	0.98
GpF:							
Gilpin--------------	55	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Droughty	0.75	Depth to bedrock	0.00	Too acid	0.76
		Depth to bedrock	0.79	Low strength	0.00	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88

Table 15b.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GpF:							
Petros	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Rock fragments	0.00
		Organic matter content low	0.12			Depth to bedrock	0.00
		Too acid	0.54			Too acid	0.98
GsB:							
Gilpin	63	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Too acid	0.76
		Droughty	0.75	Low strength	0.00	Depth to bedrock	0.79
		Depth to bedrock	0.79			Rock fragments	0.88
		Organic matter content low	0.88				
Sequoia	30	Fair		Poor		Fair	
		Organic matter content low	0.12	Low strength	0.00	Too clayey	0.17
				Depth to bedrock	0.00	Depth to bedrock	0.84
		Too clayey	0.29	Shrink-swell	0.99	Too acid	0.98
		Too acid	0.50				
		Droughty	0.75				
		Depth to bedrock	0.84				
		Water erosion	0.99				
GsC:							
Gilpin	63	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Too acid	0.76
		Droughty	0.75	Low strength	0.00	Depth to bedrock	0.79
		Depth to bedrock	0.79			Rock fragments	0.88
		Organic matter content low	0.88				
Sequoia	30	Fair		Poor		Fair	
		Organic matter content low	0.12	Low strength	0.00	Too clayey	0.17
				Depth to bedrock	0.00	Depth to bedrock	0.84
		Too clayey	0.29	Shrink-swell	0.99	Too acid	0.98
		Too acid	0.50				
		Droughty	0.75				
		Depth to bedrock	0.84				
		Water erosion	0.99				
GsD:							
Gilpin	55	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.75	Low strength	0.00	Too acid	0.76
		Depth to bedrock	0.79	Slope	0.82	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88
Sequoia	30	Fair		Poor		Poor	
		Organic matter content low	0.12	Low strength	0.00	Slope	0.00
				Depth to bedrock	0.00	Too clayey	0.17
		Too clayey	0.29	Slope	0.82	Depth to bedrock	0.84
		Too acid	0.50	Shrink-swell	0.99	Too acid	0.98
		Droughty	0.75		0.99		
		Depth to bedrock	0.84				
		Water erosion	0.99				

Table 15b.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ItE:							
Itmann, unstable fill	90	Fair		Poor		Poor	
		Organic matter content low	0.01	Slope	0.00	Rock fragments	0.00
		Too acid	0.50			Slope	0.00
						Too acid	0.00
						Hard to reclaim (rock fragments)	0.08
LdB:							
Lily	90	Fair		Poor		Fair	
		Droughty	0.32	Depth to bedrock	0.00	Depth to bedrock	0.54
		Too acid	0.50			Too acid	0.59
		Depth to bedrock	0.54				
LdC:							
Lily	83	Fair		Poor		Fair	
		Droughty	0.32	Depth to bedrock	0.00	Depth to bedrock	0.54
		Too acid	0.50			Too acid	0.59
		Depth to bedrock	0.54				
LdD:							
Lily	85	Fair		Poor		Poor	
		Droughty	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.98	Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59
LgC:							
Lily	50	Fair		Poor		Fair	
		Droughty	0.32	Depth to bedrock	0.00	Depth to bedrock	0.54
		Too acid	0.50			Too acid	0.59
		Depth to bedrock	0.54			Slope	0.96
Gilpin	40	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Too acid	0.76
		Droughty	0.75	Low strength	0.00	Depth to bedrock	0.79
		Depth to bedrock	0.79			Rock fragments	0.88
		Organic matter content low	0.88			Slope	0.96
LgD:							
Lily	60	Fair		Poor		Poor	
		Droughty	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.98	Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59
Gilpin	35	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.75	Low strength	0.00	Too acid	0.76
		Depth to bedrock	0.79	Slope	0.98	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88
LgE:							
Lily	55	Fair		Poor		Poor	
		Droughty	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59

Table 15b.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgE:							
Gilpin	30	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.75	Slope	0.00	Too acid	0.76
		Depth to bedrock	0.79	Low strength	0.00	Depth to bedrock	0.79
		Organic matter content low	0.88			Rock fragments	0.88
LmC:							
Lily	65	Fair		Poor		Fair	
		Droughty	0.32	Depth to bedrock	0.00	Depth to bedrock	0.54
		Too acid	0.50			Too acid	0.59
		Depth to bedrock	0.54			Rock fragments	0.82
		Too sandy	0.99			Slope	0.96
						Too sandy	0.99
Ramsey	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00			Rock fragments	0.02
		Organic matter content low	0.12			Slope	0.96
		Too acid	0.54			Too acid	0.98
LmD:							
Lily	60	Fair		Poor		Poor	
		Droughty	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.98	Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59
		Too sandy	0.99			Rock fragments	0.82
						Too sandy	0.99
Ramsey	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.98	Slope	0.00
		Organic matter content low	0.12			Rock fragments	0.02
		Too acid	0.54			Too acid	0.98
LmE:							
Lily	60	Fair		Poor		Poor	
		Droughty	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59
		Too sandy	0.99			Rock fragments	0.82
						Too sandy	0.99
Ramsey	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.12			Rock fragments	0.02
		Too acid	0.54			Too acid	0.98
LoB:							
Lonewood	80	Fair		Poor		Fair	
		Organic matter content low	0.12	Low strength	0.00	Too acid	0.98
		Too acid	0.50				
		Water erosion	0.99				

Table 15b.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LoC:							
Lonewood	90	Fair		Poor		Fair	
		Organic matter content low	0.12	Low strength	0.00	Slope	0.96
		Too acid	0.50			Too acid	0.98
		Water erosion	0.99				
Ps:							
Pope, frequently flooded	55	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Organic matter content low	0.12				
		Too acid	0.50				
		Water erosion	0.99				
Skidmore, frequently flooded	40	Poor		Poor		Poor	
		Stone content	0.00	Stones	0.00	Rock fragments	0.00
		Too sandy	0.04	Cobble content	0.03	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12			Too sandy	0.04
		Cobble content	0.89				
		Too acid	0.92				
		Droughty	0.99				
RaF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Ramsey	40	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.12			Rock fragments	0.02
		Too acid	0.54			Too acid	0.98
SaC:							
Shelocta	90	Fair		Poor		Fair	
		Too acid	0.32	Low strength	0.00	Hard to reclaim (rock fragments)	0.88
						Rock fragments	0.88
						Too acid	0.88
						Slope	0.96
SaD:							
Shelocta	90	Fair		Poor		Poor	
		Too acid	0.32	Low strength	0.00	Slope	0.00
						Hard to reclaim (rock fragments)	0.88
						Rock fragments	0.88
						Too acid	0.88
SaE:							
Shelocta	90	Fair		Poor		Poor	
		Too acid	0.32	Slope	0.00	Slope	0.00
				Low strength	0.00	Hard to reclaim (rock fragments)	0.88
						Rock fragments	0.88
						Too acid	0.88

Table 15b.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SbF:							
Shelocta, extremely stony	45	Fair		Poor		Poor	
		Too acid	0.32	Slope	0.00	Slope	0.00
				Low strength	0.00	Hard to reclaim (rock fragments)	0.88
						Rock fragments	0.88
						Too acid	0.88
Bouldin, extremely stony	25	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.12	Stones	0.00	Hard to reclaim (rock fragments)	0.00
		Too acid	0.50	Cobble content	0.77	Rock fragments	0.32
						Too acid	0.92
Sk:							
Skidmore, frequently flooded	100	Poor		Poor		Poor	
		Stone content	0.00	Stones	0.00	Rock fragments	0.00
		Too sandy	0.04	Cobble content	0.03	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12			Too sandy	0.04
		Cobble content	0.89				
		Too acid	0.92				
		Droughty	0.99				
W:							
Water	100	Not rated		Not rated		Not rated	
WnB:							
Wernock	92	Fair		Poor		Fair	
		Organic matter content low	0.12	Low strength	0.00	Too clayey	0.53
		Too acid	0.50	Depth to bedrock	0.00	Too acid	0.88
		Depth to bedrock	0.90			Depth to bedrock	0.90
		Too clayey	0.92				
		Water erosion	0.99				
WnC:							
Wernock	92	Fair		Poor		Fair	
		Organic matter content low	0.12	Low strength	0.00	Too clayey	0.53
		Too acid	0.50	Depth to bedrock	0.00	Too acid	0.99
		Depth to bedrock	0.90			Depth to bedrock	0.90
		Too clayey	0.92			Slope	0.99
		Water erosion	0.99				

Table 16.—Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ak:							
Atkins, ponded	85	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Ponding	1.00	Cutbanks cave	0.10
				Depth to saturated zone	1.00		
				Piping	0.94		
AyD:							
Atkins, occasionally flooded	66	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	1.00	Cutbanks cave	0.10
				Piping	0.94		
Lily	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
Az:							
Atkins, frequently flooded	45	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	1.00	Cutbanks cave	0.10
				Piping	0.94		
Skidmore, frequently flooded	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Depth to water	1.00
				Large stones	1.00		
GaC:							
Gilpin	89	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
GaD:							
Gilpin	85	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
GbF:							
Gilpin, stony	45	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
Bouldin, very stony-	42	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Large stones	0.97	Depth to water	1.00
		Slope	1.00				

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GdF:							
Gilpin, stony-------	35	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
Bouldin, very stony-	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Large stones	0.97	Depth to water	1.00
		Slope	1.00				
Petros, stony-------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Seepage	1.00	Depth to water	1.00
		Depth to bedrock	0.61	Thin layer	1.00		
GpE:							
Gilpin--------------	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
Petros--------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Seepage	1.00	Depth to water	1.00
		Depth to bedrock	0.61	Thin layer	1.00		
GpF:							
Gilpin--------------	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
Petros--------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Seepage	1.00	Depth to water	1.00
		Depth to bedrock	0.61	Thin layer	1.00		
GsB:							
Gilpin--------------	63	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.77	Depth to water	1.00
		Depth to bedrock	0.06	Piping	0.01		
Sequoia-------------	30	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.74	Depth to water	1.00
		Depth to bedrock	0.05				
GsC:							
Gilpin--------------	63	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
Sequoia-------------	30	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	0.72				
		Depth to bedrock	0.05				
GsD:							
Gilpin--------------	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsD:							
Sequoia	30	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	0.72				
		Depth to bedrock	0.05				
ItE:							
Itmann, unstable fill	90	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
LdB:							
Lily	90	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Depth to bedrock	0.86				
		Slope	0.08				
LdC:							
Lily	83	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
LdD:							
Lily	85	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
LgC:							
Lily	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
Gilpin	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
LgD:							
Lily	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
Gilpin	35	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
LgE:							
Lily	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LgE:							
Gilpin	30	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.77	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.06				
LmC:							
Lily	65	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
Ramsey	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Thin layer	1.00	Depth to water	1.00
		Slope	1.00	Seepage	0.40		
LmD:							
Lily	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
Ramsey	35	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.40		
LmE:							
Lily	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
Ramsey	35	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.40		
LoB:							
Lonewood	80	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Piping	0.01	Depth to water	1.00
		Slope	0.08				
LoC:							
Lonewood	90	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.01	Depth to water	1.00
		Seepage	0.72				
Ps:							
Pope, frequently flooded	55	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
Skidmore, frequently flooded	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Depth to water	1.00
				Large stones	1.00		

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RaF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Ramsey	40	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.40		
SaC:							
Shelocta	90	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.13	Depth to water	1.00
		Seepage	1.00				
SaD:							
Shelocta	90	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.13	Depth to water	1.00
		Seepage	1.00				
SaE:							
Shelocta	90	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.13	Depth to water	1.00
		Seepage	1.00				
SbF:							
Shelocta, extremely stony	45	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.13	Depth to water	1.00
		Seepage	1.00				
Bouldin, extremely stony	25	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Large stones	0.97	Depth to water	1.00
		Slope	1.00				
Sk:							
Skidmore, frequently flooded	100	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Cutbanks cave	1.00
				Large stones	1.00	Large stones	1.00
						Depth to saturated zone	0.96
W:							
Water	100	Not rated		Not rated		Not rated	
WnB:							
Wernock	92	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Thin layer	0.70	Depth to water	1.00
		Depth to bedrock	0.04	Piping	0.01		
		Slope	0.02				
WnC:							
Wernock	92	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.70	Depth to water	1.00
		Seepage	0.72	Piping	0.01		
		Depth to bedrock	0.04				

Table 17.—Physical and Chemical Analyses of Selected Soils

Map unit symbol	User pedon ID	Pedon type	Component name	Lab ID	Lab pedon number
GbF	07TN650036	TUD	Bouldin	NSSL	07N0507
GaC	06TN650035	TUD	Gilpin	NSSL	07N0227
GsD	07KY650104	TUD	Sequoia	NSSL	07N0508
ItE	07KY650003	TUD	Itmann	NSSL	07N0505
LmD	06TN650034	TUD	Lily	NSSL	07N0225
LmD	07TN650077	TUD	Ramsey	NSSL	07N0226
Ps	07TN650039	TUD	Pope	NSSL	08N0187
Ps	07TN650038	TUD	Skidmore	NSSL	08N0190
SbF	07KY650340	TUD	Shelocta	NSSL	08N0186

Table 18.—Engineering Index Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
Ak:												
Atkins, ponded--	0-15	Silt loam, loam	CL-ML, CL, ML	A-4, A-6	0	0-1	93-100	85-100	64-96	48-77	20-45	5-20
	6-117	Silty clay loam, silt loam, clay loam, loam	CL	A-6	0	0-1	94-100	85-100	75-100	55-82	30-45	10-25
	46-157	Loam, gravelly loam, gravelly fine sandy loam, fine sandy loam, gravelly sandy loam	CL-ML, CL, SC	A-2, A-4, A-6	0	0-3	88-100	72-100	62-99	27-50	20-30	5-15
AyD:												
Atkins, occasionally flooded--------	0-15	Silt loam, loam	CL, ML, CL-ML	A-4, A-6	0	0-5	88-100	74-100	56-96	42-77	20-45	5-20
	6-117	Silty clay loam, silt loam, clay loam, loam	CL	A-6	0	0-3	91-100	80-100	75-100	66-100	30-45	10-25
	46-157	Loam, gravelly loam, gravelly fine sandy loam, fine sandy loam, gravelly sandy loam	SC, CL, CL-ML	A-2, A-4, A-6	0	0-9	90-100	77-100	66-99	28-50	20-30	5-15
Lily----------	0-25	Loam, fine sandy loam	CL, SM	A-4, A-6	0	0-1	89-100	79-100	64-100	37-67	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam	CL, SC, ML, SM	A-4, A-6	0	0-16	81-100	64-100	50-95	27-59	30-45	10-25
	22-76	Loam, fine sandy loam, sandy loam	SC-SM, SC	A-6, A-1-b, A-2, A-4	0	0-18	78-100	61-100	43-82	20-44	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---
Az:												
Atkins, frequently flooded--------	0-15	Silt loam, loam	CL-ML, CL, ML	A-4, A-6	0	0-5	88-100	74-100	56-96	42-77	20-45	5-20
	6-117	Silty clay loam, silt loam, clay loam, loam	CL	A-6	0	0-3	91-100	80-100	75-100	66-100	30-45	10-25
	46-157	Loam, gravelly loam, gravelly fine sandy loam, fine sandy loam, gravelly sandy loam	SC, CL, CL-ML	A-2, A-4, A-6	0	0-9	90-100	77-100	66-99	28-50	20-30	5-15

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
Az:												
Skidmore, frequently flooded--------	0-8	Channery fine sandy loam	SM, SC-SM, SC	A-2, A-4, A-2-4	0	16-30	85-94	71-91	61-87	25-41	0-25	NP-10
	3-28	Gravelly sandy loam, cobbly loam, extremely channery sandy loam, very cobbly sandy loam	SC-SM, SC, SP-SC, SM	A-1, A-2, A-1-a, A-1-b	9-25	7-29	59-93	18-90	13-71	6-37	0-25	NP-10
	11-86	Extremely cobbly loamy sand, very gravelly sandy loam, very cobbly sandy loam, extremely channery loamy sand	SP-SC, GP-GM, GM, GC-GM, GC	A-1, A-2, A-1-b	14-28	23-47	50-88	17-82	13-67	4-21	0-25	NP-8
	34-156	Gravelly sandy loam, cobbly loam, very channery loamy sand, very cobbly sandy loam	GC, GM, SC, SC-SM, SM	A-1, A-2, A-2-4, A-1-b	12-23	12-36	62-88	49-82	35-66	11-27	0-25	NP-10
GaC:												
Gilpin----------	0-18	Silt loam	CL-ML, CL	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	GC, CL, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
GaD:												
Gilpin----------	0-18	Silt loam	CL-ML, CL	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	SC, GC, CL	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
GbF:												
Gilpin, stony---	0-18	Silt loam	CL, CL-ML	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	SC, GC, CL	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
Bouldin, very stony----------	0-15	Very bouldery loam, flaggy fine sandy loam, very bouldery fine sandy loam	SM, SC, GC-GM, ML, SC-SM, GM	A-2, A-4	16-48	8-30	59-94	31-90	26-89	13-53	20-45	5-20
	6-33	Very bouldery loam, very channery loam, extremely channery loam, channery fine sandy loam, very channery fine sandy loam, extremely channery fine sandy loam, very cobbly loam, very flaggy loam	SC, SC-SM, GC-GM	A-2, A-4, A-6	0-26	4-21	60-89	27-82	21-79	14-59	20-40	5-20
	13-203	Stony clay loam, extremely channery clay loam, very stony clay loam, very bouldery loam, stony loam, extremely channery loam, very stony loam, extremely stony loam, stony sandy clay loam, extremely channery sandy clay loam, very stony sandy clay loam, very bouldery sandy clay loam	SC	A-2, A-4, A-6	19-31	19-30	80-91	61-81	50-81	30-55	20-45	5-25

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
GdF:												
Gilpin, stony---	0-18	Silt loam	CL, CL-ML	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	CL, GC, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
Bouldin, very stony----------	0-15	Very bouldery loam, flaggy fine sandy loam, very bouldery fine sandy loam	ML, GM, GC-GM, SM, SC, SC-SM	A-2, A-4	16-48	8-30	59-94	31-90	26-89	13-53	20-45	5-20
	6-33	Very bouldery loam, very channery loam, extremely channery loam, channery fine sandy loam, very channery fine sandy loam, extremely channery fine sandy loam, very cobbly loam, very flaggy loam	GC-GM, SC, SC-SM	A-2, A-4, A-6	0-26	4-21	60-89	27-82	21-79	14-59	20-40	5-20
	13-203	Stony clay loam, extremely channery clay loam, very stony clay loam, very bouldery loam, stony loam, extremely channery loam, very stony loam, extremely stony loam, stony sandy clay loam, extremely channery sandy clay loam, very stony sandy clay loam, very bouldery sandy clay loam	SC	A-2, A-4, A-6	19-31	19-30	80-91	61-81	50-81	30-55	20-45	5-25

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
GdF:												
Petros, stony---	0-5	Channery silt loam, channery loam	CL, SC, CL-ML	A-4, A-6	0	0-12	79-100	56-100	46-100	37-87	20-40	5-20
	2-20	Very channery silty clay loam, extremely channery silty clay loam, very channery silt loam, extremely channery silt loam	GC-GM, GC, SC	A-2, A-6	0	0-25	61-84	15-62	14-62	12-62	30-45	10-25
	8-41	Very channery silty clay loam, extremely channery silty clay loam, very channery silt loam, extremely channery silt loam	GC-GM, GC, SC	A-2-6, A-2	0	0-31	57-79	14-51	12-51	10-48	20-45	5-25
	16-66	Weathered bedrock			---	---	---	---	---	---	---	---
GpE:												
Gilpin----------	0-18	Silt loam	CL-ML, CL	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	CL, GC, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
Petros----------	0-5	Channery silt loam, channery loam	SC, CL-ML, CL	A-4, A-6	0	0-12	79-100	56-100	46-100	37-87	20-40	5-20
	2-20	Very channery silty clay loam, extremely channery silty clay loam, very channery silt loam, extremely channery silt loam	SC, GC, GC-GM	A-2, A-6	0	0-25	61-84	15-62	14-62	12-62	30-45	10-25
	8-41	Very channery silty clay loam, extremely channery silty clay loam, very channery silt loam, extremely channery silt loam	GC-GM, GC, SC	A-2-6, A-2	0	0-31	57-79	14-51	12-51	10-48	20-45	5-25
	16-66	Weathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
GpF:												
Gilpin----------	0-18	Silt loam	CL, CL-ML	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	SC, GC, CL	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
Petros----------	0-5	Channery silt loam, channery loam	CL, CL-ML, SC	A-4, A-6	0	0-12	79-100	56-100	46-100	37-87	20-40	5-20
	2-20	Very channery silty clay loam, extremely channery silty clay loam, very channery silt loam, extremely channery silt loam	GC, GC-GM, SC	A-2, A-6	0	0-25	61-84	15-62	14-62	12-62	30-45	10-25
	8-41	Very channery silty clay loam, extremely channery silty clay loam, very channery silt loam, extremely channery silt loam	GC-GM, GC, SC	A-2-6, A-2	0	0-31	57-79	14-51	12-51	10-48	20-45	5-25
	16-66	Weathered bedrock			---	---	---	---	---	---	---	---
GsB:												
Gilpin----------	0-18	Silt loam	CL-ML, CL	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	GC, CL, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
GsB:												
Sequoia	0-13	Silt loam	CL, CL-ML	A-4, A-6	0	0	93-100	87-100	81-100	70-91	23-41	7-19
	5-50	Silty clay loam, silty clay	CL	A-4, A-6, A-7-6	0	0	93-100	90-100	88-100	78-100	35-66	10-43
	20-86	Silty clay, channery silty clay	CL, CH	A-7, A-7-6	0	0-13	86-100	72-100	62-100	56-100	43-67	25-44
	34-111	Weathered bedrock			---	---	---	---	---	---	---	---
GsC:												
Gilpin	0-18	Silt loam	CL-ML, CL	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	GC, CL, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
Sequoia	0-13	Silt loam	CL, CL-ML	A-4, A-6	0	0	93-100	87-100	81-100	70-91	23-41	7-19
	5-50	Silty clay loam, silty clay	CL	A-4, A-6, A-7-6	0	0	93-100	90-100	88-100	78-100	35-66	10-43
	20-86	Silty clay, channery silty clay	CL, CH	A-7, A-7-6	0	0-13	86-100	72-100	62-100	56-100	43-67	25-44
	34-111	Weathered bedrock			---	---	---	---	---	---	---	---
GsD:												
Gilpin	0-18	Silt loam	CL, CL-ML	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	GC, CL, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
Sequoia	0-13	Silt loam	CL-ML, CL	A-4, A-6	0	0	93-100	87-100	81-100	70-91	23-41	7-19
	5-50	Silty clay loam, silty clay	CL	A-4, A-6, A-7-6	0	0	93-100	90-100	88-100	78-100	35-66	10-43
	20-86	Silty clay, channery silty clay	CL, CH	A-7, A-7-6	0	0-13	86-100	72-100	62-100	56-100	43-67	25-44
	34-111	Weathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
ItE:												
Itmann, unstable fill	0-10	Very parachannery loam	GM, GC-GM	A-2, A-4	0	2-12	47-68	10-65	8-54	4-50	15-25	NP-7
	4-200	Very parachannery loam, very channery loam, extremely parachannery clay loam	GM, GC-GM	A-2, A-4	0	4-16	55-65	11-60	8-45	4-45	15-25	NP-7
LdB:												
Lily	0-25	Loam, fine sandy loam	CL, SM	A-4, A-6	0	0-1	89-100	79-100	64-100	37-67	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam	SM, SC, CL, ML	A-4, A-6	0	0-16	81-100	64-100	50-95	27-59	30-45	10-25
	22-76	Loam, fine sandy loam, sandy loam	SC-SM, SC	A-6, A-1-b, A-2, A-4	0	0-18	78-100	61-100	43-82	20-44	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---
LdC:												
Lily	0-25	Loam, fine sandy loam	SM, CL	A-4, A-6	0	0-1	89-100	79-100	64-100	37-67	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam	ML, SC, SM, CL	A-4, A-6	0	0-16	81-100	64-100	50-95	27-59	30-45	10-25
	22-76	Loam, fine sandy loam, sandy loam	SC, SC-SM	A-6, A-1-b, A-2, A-4	0	0-18	78-100	61-100	43-82	20-44	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---
LdD:												
Lily	0-25	Loam, fine sandy loam	CL, SM	A-4, A-6	0	0-1	89-100	79-100	64-100	37-67	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam	CL, SC, ML, SM	A-4, A-6	0	0-16	81-100	64-100	50-95	27-59	30-45	10-25
	22-76	Loam, fine sandy loam, sandy loam	SC-SM, SC	A-6, A-1-b, A-2, A-4	0	0-18	78-100	61-100	43-82	20-44	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---
LgC:												
Lily	0-25	Loam, fine sandy loam	SC	A-4, A-2-6	0	0-1	89-100	79-100	74-100	25-44	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam	ML, SM, SC, CL	A-4, A-6	0	0-16	81-100	64-100	50-95	27-59	30-45	10-25
	22-76	Loam, fine sandy loam, sandy loam	SC, SC-SM	A-6, A-1-b, A-2, A-4	0	0-18	78-100	61-100	43-82	20-44	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
LgC:												
Gilpin----------	0-18	Silt loam	CL, CL-ML	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	SC, GC, CL	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
LgD:												
Lily----------	0-25	Loam, fine sandy loam	SC, SM	A-4, A-2-6	0	0-1	89-100	79-100	74-100	25-44	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam	SM, CL, ML, SC	A-4, A-6	0	0-16	81-100	64-100	50-95	27-59	30-45	10-25
	22-76	Loam, fine sandy loam, sandy loam	SC, SC-SM	A-6, A-1-b, A-2, A-4	0	0-18	78-100	61-100	43-82	20-44	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---
Gilpin----------	0-18	Silt loam	CL-ML, CL	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	CL, GC, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
LgE:												
Lily----------	0-25	Loam, fine sandy loam	SC, SM	A-4, A-2-6	0	0-1	89-100	79-100	74-100	25-44	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam	CL, ML, SC, SM	A-4, A-6	0	0-16	81-100	64-100	50-95	27-59	30-45	10-25
	22-76	Loam, fine sandy loam, sandy loam	SC-SM, SC	A-6, A-1-b, A-2, A-4	0	0-18	78-100	61-100	43-82	20-44	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
LgE:												
Gilpin----------	0-18	Silt loam	CL-ML, CL	A-4, A-6	0	0-5	94-96	81-91	72-91	50-77	25-45	5-20
	7-58	Silt loam, channery silt loam, clay loam, channery clay loam, loam, channery loam	CL	A-6, A-7, A-7-6	0	0-1	86-97	78-92	74-92	56-82	30-45	10-25
	23-84	Silty clay loam, channery silty clay loam, clay loam, channery clay loam, loam, channery loam	CL, GC, SC	A-6, A-7-6	0	0-7	72-96	55-91	43-91	36-81	25-50	10-30
	33-109	Weathered bedrock			---	---	---	---	---	---	---	---
LmC:												
Lily----------	0-25	Loam, fine sandy loam	SC, SM	A-4, A-2-6	0	0-1	89-100	79-100	74-100	25-44	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam, fine sandy loam	SC, ML, CL, SM	A-4, A-2-6	0	0-8	80-100	64-100	58-100	19-57	30-45	10-25
	22-76	Loam, fine sandy loam, sandy clay loam	SC, SC-SM	A-6, A-2, A-4	0	0-4	90-100	80-100	65-100	25-60	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---
Ramsey----------	0-10	Loam	SC-SM, ML, SM, CL, CL-ML	A-2, A-4	0	0-4	91-97	82-92	65-89	34-65	20-39	4-17
	4-25	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	CL-ML, SC-SM, SC	A-2, A-4	0	0	89-100	78-100	66-100	28-50	18-36	4-17
	10-41	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	SC-SM, CL-ML, SC	A-4, A-1, A-2, A-2-4	0	0-14	74-100	54-100	39-88	17-50	18-36	4-17
	16-66	Unweathered bedrock			---	---	---	---	---	---	---	---
LmD:												
Lily----------	0-25	Loam, fine sandy loam	SC, SM	A-4, A-2-6	0	0-1	89-100	79-100	74-100	25-44	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam, fine sandy loam	ML, CL, SC, SM	A-4, A-2-6	0	0-8	80-100	64-100	58-100	19-57	30-45	10-25
	22-76	Loam, fine sandy loam, sandy clay loam	SC, SC-SM	A-6, A-2, A-4	0	0-4	90-100	80-100	65-100	25-60	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
LmD:												
Ramsey----------	0-10	Loam	SM, SC-SM, ML, CL-ML, CL	A-2, A-4	0	0-4	91-97	82-92	65-89	34-65	20-39	4-17
	4-25	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	SC-SM, CL-ML, SC	A-2, A-4	0	0	89-100	78-100	66-100	28-50	18-36	4-17
	10-41	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	SC, CL-ML, SC-SM	A-4, A-1, A-2, A-2-4	0	0-14	74-100	54-100	39-88	17-50	18-36	4-17
	16-66	Unweathered bedrock			---	---	---	---	---	---	---	---
LmE:												
Lily------------	0-25	Loam, fine sandy loam	SC, SM	A-4, A-2-6	0	0-1	89-100	79-100	74-100	25-44	20-40	NP-15
	10-56	Clay loam, loam, sandy clay loam, fine sandy loam	ML, SM, CL, SC	A-4, A-2-6	0	0-8	80-100	64-100	58-100	19-57	30-45	10-25
	22-76	Loam, fine sandy loam, sandy clay loam	SC, SC-SM	A-6, A-2, A-4	0	0-4	90-100	80-100	65-100	25-60	15-30	5-15
	30-101	Unweathered bedrock			---	---	---	---	---	---	---	---
Ramsey----------	0-10	Loam	CL-ML, SC-SM, SM, ML, CL	A-2, A-4	0	0-4	91-97	82-92	65-89	34-65	20-39	4-17
	4-25	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	SC-SM, CL-ML, SC	A-2, A-4	0	0	89-100	78-100	66-100	28-50	18-36	4-17
	10-41	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	SC, CL-ML, SC-SM	A-4, A-1, A-2, A-2-4	0	0-14	74-100	54-100	39-88	17-50	18-36	4-17
	16-66	Unweathered bedrock			---	---	---	---	---	---	---	---
LoB:												
Lonewood--------	0-20	Silt loam, loam	CL, CL-ML, ML	A-4, A-6	0	0-4	94-100	84-100	74-100	61-87	25-45	5-20
	8-71	Silty clay loam, silt loam, clay loam, loam	CL	A-6, A-7	0	0	97-100	92-100	75-100	62-95	25-45	10-25
	28-150	Silty clay loam, clay loam	CL	A-6, A-7, A-7-6	0	0	95-100	83-100	75-100	60-95	35-50	20-30
	59-175	Weathered bedrock			---	---	---	---	---	---	---	---

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
LoC:												
Lonewood--------	0-20	Silt loam, loam	CL-ML, ML, CL	A-4, A-6	0	0-4	94-100	84-100	74-100	61-87	25-45	5-20
	8-71	Silty clay loam, silt loam, clay loam, loam	CL	A-6, A-7	0	0	97-100	92-100	75-100	62-95	25-45	10-25
	28-150	Silty clay loam, clay loam	CL	A-6, A-7, A-7-6	0	0	95-100	83-100	75-100	60-95	35-50	20-30
	59-175	Weathered bedrock			---	---	---	---	---	---	---	---
Ps:												
Pope, frequently flooded--------	0-8	Loamy sand, sand, sandy loam, fine sandy loam	SC, CL-ML, CL, ML, SM	A-4, A-6, A-2-6, A-2	0	0-4	89-100	74-100	67-100	18-50	20-45	5-20
	3-58	Loamy sand, sand, sandy loam, fine sandy loam	CL, ML, CL-ML, SP-SC, SM	A-2, A-4, A-2-6, A-2-4	0	0-2	93-100	84-100	73-100	10-50	15-40	NP-20
	23-188	Fine sandy loam, gravelly fine sandy loam, very gravelly fine sandy loam, sandy loam, gravelly sandy loam, very gravelly sandy loam	SC-SM, SM, SC	A-2-4, A-2, A-4	0	0-3	92-100	82-100	75-100	30-50	15-30	NP-15
Skidmore, frequently flooded--------	0-8	Channery fine sandy loam	SC-SM, SM, SC	A-2, A-4, A-2-4	0	16-30	85-94	71-91	61-87	25-41	0-25	NP-10
	3-28	Gravelly sandy loam, cobbly loam, very channery sandy loam, very cobbly sandy loam	SC-SM, SM, SC	A-1, A-2, A-2-4, A-1-b	14-25	23-29	78-88	56-82	39-65	17-33	0-25	NP-10
	11-86	Extremely cobbly loamy sand, very gravelly sandy loam, very cobbly sandy loam, extremely channery loamy sand	SP-SC, GP-GM, GM, GC-GM, GC	A-1, A-2, A-1-b	14-28	23-47	50-88	17-82	13-67	4-21	0-25	NP-8
	34-156	Gravelly sandy loam, cobbly loam, very channery loamy sand, very cobbly sandy loam	SC, SM, SC-SM, GM, GC	A-1, A-2, A-2-4, A-1-b	12-23	12-36	62-88	49-82	35-66	11-27	0-25	NP-10

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
RaF:												
Rock outcrop.												
Ramsey----------	0-10	Loam	SC-SM, SM, CL, CL-ML, ML	A-2, A-4	0	0-4	91-97	82-92	65-89	34-65	20-39	4-17
	4-25	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	SC, CL-ML, SC-SM	A-2, A-4	0	0	89-100	78-100	66-100	28-50	18-36	4-17
	10-41	Loam, channery loam, fine sandy loam, channery fine sandy loam, sandy loam, channery sandy loam	SC-SM, CL-ML, SC	A-4, A-1, A-2, A-2-4	0	0-14	74-100	54-100	39-88	17-50	18-36	4-17
	16-66	Unweathered bedrock			---	---	---	---	---	---	---	---
SaC:												
Shelocta--------	0-23	Loam	CL, CL-ML, SM, ML, GM	A-4, A-6	0-8	0-10	83-98	66-96	52-93	41-76	0-35	NP-15
	9-140	Channery silty clay loam, very channery silty clay loam, silt loam, channery silt loam, very channery silt loam	SC, CL, GC, CL-ML	A-6, A-4	0-7	0-10	72-95	49-92	43-92	38-88	25-45	5-25
	55-193	Channery silty clay loam, very channery silty clay loam, extremely channery silty clay loam, channery silt loam, very channery silt loam, extremely channery silt loam, channery clay loam, very channery clay loam, extremely channery clay loam, channery loam, very channery loam, extremely channery loam	ML, GM, GC, CL	A-2, A-4, A-6, A-1-b	0-15	5-23	62-95	30-91	26-91	22-86	25-40	5-25

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
SaD:												
Shelocta--------	0-23	Loam	CL, CL-ML, SM, GM, ML	A-4, A-6	0-5	0-12	78-98	58-96	46-93	36-76	0-35	NP-15
	9-140	Channery silty clay loam, very channery silty clay loam, silt loam, channery silt loam, very channery silt loam	CL, GC, SC, CL-ML	A-6, A-4	0-7	0-10	72-95	49-92	43-92	38-88	25-45	5-25
	55-193	Channery silty clay loam, very channery silty clay loam, extremely channery silty clay loam, channery silt loam, very channery silt loam, extremely channery silt loam, channery clay loam, very channery clay loam, extremely channery clay loam, channery loam, very channery loam, extremely channery loam	GM, ML, GC, CL	A-2, A-4, A-6, A-1-b	0-15	5-23	62-95	30-91	26-91	22-86	25-40	5-25

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
SaE:												
Shelocta--------	0-23	Loam	GM, CL, CL-ML, SM, ML	A-4, A-6	0-5	0-12	78-98	58-96	46-93	36-76	0-35	NP-15
	9-140	Channery silty clay loam, very channery silty clay loam, silt loam, channery silt loam, very channery silt loam	CL-ML, SC, GC, CL	A-6, A-4	0-7	0-10	72-95	49-92	43-92	38-88	25-45	5-25
	55-193	Channery silty clay loam, very channery silty clay loam, extremely channery silty clay loam, channery silt loam, very channery silt loam, extremely channery silt loam, channery clay loam, very channery clay loam, extremely channery clay loam, channery loam, very channery loam, extremely channery loam	GC, ML, GM, CL	A-2, A-4, A-6, A-1-b	0-15	5-23	62-95	30-91	26-91	22-86	25-40	5-25

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
SbF:												
Shelocta, extremely stony	0-23	Loam	CL, CL-ML, SM, ML, GM	A-4, A-6	0-5	0-12	78-98	58-96	46-93	36-76	0-35	NP-15
	9-140	Channery silty clay loam, very channery silty clay loam, silt loam, channery silt loam, very channery silt loam	SC, GC, CL-ML, CL	A-6, A-4	0-7	0-10	72-95	49-92	43-92	38-88	25-45	5-25
	55-193	Channery silty clay loam, very channery silty clay loam, extremely channery silty clay loam, channery silt loam, very channery silt loam, extremely channery silt loam, channery clay loam, very channery clay loam, extremely channery clay loam, channery loam, very channery loam, extremely channery loam	CL, GC, GM, ML	A-2, A-4, A-6, A-1-b	0-15	5-23	62-95	30-91	26-91	22-86	25-40	5-25

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
SbF:												
Bouldin, extremely stony	0-15	Very bouldery loam, flaggy fine sandy loam, very bouldery fine sandy loam	SC, ML, SC-SM, GM, GC-GM, SM	A-2, A-4	16-48	8-30	59-94	31-90	26-89	13-53	20-45	5-20
	6-33	Very bouldery loam, very channery loam, extremely channery loam, channery fine sandy loam, very channery fine sandy loam, extremely channery fine sandy loam, very cobbly loam, very flaggy loam	GC-GM, SC-SM, SC	A-2, A-4, A-6	0-26	4-21	60-89	27-82	21-79	14-59	20-40	5-20
	13-203	Stony clay loam, extremely channery clay loam, very stony clay loam, very bouldery loam, stony loam, extremely channery loam, very stony loam, extremely stony loam, stony sandy clay loam, extremely channery sandy clay loam, very stony sandy clay loam, very bouldery sandy clay loam	SC	A-2, A-4, A-6	19-31	19-30	80-91	61-81	50-81	30-55	20-45	5-25

Table 18.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	Cm				Pct	Pct					Pct	
Sk:												
Skidmore, frequently flooded--------	0-8	Channery fine sandy loam	SM, SC-SM, SC	A-2, A-4, A-2-4	0	16-30	85-94	71-91	61-87	25-41	0-25	NP-10
	3-28	Gravelly sandy loam, cobbly loam, very channery sandy loam, very cobbly sandy loam	SC, SM, SC-SM	A-1, A-2, A-2-4, A-1-b	14-25	23-29	78-88	56-82	39-65	17-33	0-25	NP-10
	11-86	Extremely cobbly loamy sand, very gravelly sandy loam, very cobbly sandy loam, extremely channery loamy sand	GC, SP-SC, GP-GM, GM, GC-GM	A-1, A-2, A-1-b	14-28	23-47	50-88	17-82	13-67	4-21	0-25	NP-8
	34-156	Gravelly sandy loam, cobbly loam, very channery loamy sand, very cobbly sandy loam	SM, SC-SM, SC, GC, GM	A-1, A-2, A-2-4, A-1-b	12-23	12-36	62-88	49-82	35-66	11-27	0-25	NP-10
W. Water												
WnB:												
Wernock---------	0-30	Silt loam	ML, CL	A-4, A-6	0	0	95-100	83-100	75-100	60-95	25-45	5-20
	12-69	Silt loam, silty clay loam	CL	A-6	0	0	95-100	83-100	75-100	65-100	25-50	10-30
	27-89	Silty clay loam	CL	A-6, A-7, A-7-6	0	0	92-100	80-100	75-100	65-95	35-50	20-30
	35-114	Weathered bedrock			---	---	---	---	---	---	---	---
WnC:												
Wernock---------	0-30	Silt loam	CL, ML	A-4, A-6	0	0	95-100	83-100	75-100	60-95	25-45	5-20
	12-69	Silty clay loam, silt loam	CL	A-6	0	0	95-100	83-100	75-100	65-100	25-50	10-30
	27-89	Silty clay loam	CL	A-6, A-7, A-7-6	0	0	92-100	80-100	75-100	65-95	35-50	20-30
	35-114	Weathered bedrock			---	---	---	---	---	---	---	---

Table 19.—Physical Soil Properties, Part I

(Sand and silt values (rv) are the representative value for that horizon; clay values are the range of low to high. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Sand rv	Silt rv	Clay range	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter
	Cm	Pct	Pct	Pct	g/cc	Cm/hr	Cm/cm	Pct	Pct
Ak:									
Atkins, ponded------	0-15	38	45	7-27	1.20-1.40	0.6-2	0.14-0.22	0.0-2.9	2.0-4.0
	15-117	40	40	18-35	1.20-1.50	0.06-2	0.14-0.18	0.0-2.9	0.0-0.8
	117-157	65	21	7-20	1.20-1.50	0.2-6	0.08-0.18	0.0-2.9	0.0-0.5
AyD:									
Atkins, occasionally flooded----------	0-15	38	45	7-27	1.20-1.40	0.6-2	0.14-0.22	0.0-2.9	2.0-4.0
	15-117	40	40	18-35	1.20-1.50	0.06-2	0.14-0.18	0.0-2.9	0.0-0.8
	117-157	65	21	7-20	1.20-1.50	0.2-6	0.08-0.18	0.0-2.9	0.0-0.5
Lily----------	0-25	45	33	7-27	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	56	18	18-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	67	20	7-18	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
Az:									
Atkins, frequently flooded----------	0-15	38	45	7-27	1.20-1.40	0.6-2	0.14-0.22	0.0-2.9	2.0-4.0
	15-117	40	40	18-35	1.20-1.50	0.06-2	0.14-0.18	0.0-2.9	0.0-0.8
	117-157	65	21	7-20	1.20-1.50	0.2-6	0.08-0.18	0.0-2.9	0.0-0.5
Skidmore, frequently flooded----------	0-8	68	20	5-15	1.20-1.40	2-20	0.07-0.15	0.0-2.9	1.0-3.0
	8-28	68	20	5-15	1.30-1.60	2-20	0.06-0.15	0.0-2.9	0.0-0.5
	28-86	83	9	5-10	1.35-1.55	6-20	0.04-0.09	0.0-2.9	0.0-0.5
	86-156	80	12	5-15	1.30-1.60	2-20	0.06-0.15	0.0-2.9	0.0-0.5
GaC:									
Gilpin----------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
GaD:									
Gilpin----------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
GbF:									
Gilpin, stony-------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
Bouldin, very stony-	0-15	54	35	3-26	1.23-1.38	2-6	0.06-0.10	0.0-2.9	1.0-4.0
	15-33	51	35	3-26	1.36-1.51	2-6	0.06-0.10	0.0-2.9	0.5-2.0
	33-203	45	36	8-35	1.55-1.69	2-6	0.06-0.10	0.0-2.9	0.0-0.5

Table 19.—Physical Soil Properties, Part I—Continued

Map symbol and soil name	Depth	Sand rv	Silt rv	Clay range	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter
	Cm	Pct	Pct	Pct	g/cc	Cm/hr	Cm/cm	Pct	Pct
GdF:									
Gilpin, stony-------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
Bouldin, very stony-	0-15	54	35	3-26	1.23-1.38	2-6	0.06-0.10	0.0-2.9	1.0-4.0
	15-33	51	35	3-26	1.36-1.51	2-6	0.06-0.10	0.0-2.9	0.5-2.0
	33-203	45	36	8-35	1.55-1.69	2-6	0.06-0.10	0.0-2.9	0.0-0.5
Petros, stony-------	0-5	27	55	7-27	1.30-1.50	0.6-6	0.10-0.14	0.0-2.9	0.5-2.0
	5-20	15	63	18-35	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	0.2-1.2
	20-41	27	55	12-35	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	0.0-0.5
	41-66			---	---	0.00-0.01	---	---	---
GpE:									
Gilpin---------------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
Petros---------------	0-5	27	55	7-27	1.30-1.50	0.6-6	0.10-0.14	0.0-2.9	0.5-2.0
	5-20	15	63	18-35	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	0.2-1.2
	20-41	27	55	12-35	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	0.0-0.5
	41-66			---	---	0.00-0.01	---	---	---
GpF:									
Gilpin---------------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
Petros---------------	0-5	27	55	7-27	1.30-1.50	0.6-6	0.10-0.14	0.0-2.9	0.5-2.0
	5-20	15	63	18-35	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	0.2-1.2
	20-41	27	55	12-35	1.30-1.55	0.6-6	0.04-0.09	0.0-2.9	0.0-0.5
	41-66			---	---	0.00-0.01	---	---	---
GsB:									
Gilpin---------------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
Sequoia--------------	0-13	25	59	12-27	1.15-1.50	0.6-2	0.17-0.20	0.0-2.9	0.5-2.0
	13-50	16	48	27-60	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.0-0.5
	50-86	13	40	35-60	1.35-1.55	0.2-0.6	0.08-0.16	3.0-5.9	0.0-0.5
	86-111			---	---	0.00- 0.00	---	---	---
GsC:									
Gilpin---------------	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
Sequoia--------------	0-13	25	59	12-27	1.15-1.50	0.6-2	0.17-0.20	0.0-2.9	0.5-2.0
	13-50	16	48	27-60	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.0-0.5
	50-86	13	40	35-60	1.35-1.55	0.2-0.6	0.08-0.16	3.0-5.9	0.0-0.5
	86-111			---	---	0.00- 0.00	---	---	---

Table 19.—Physical Soil Properties, Part I—Continued

Map symbol and soil name	Depth	Sand rv	Silt rv	Clay range	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter
	Cm	Pct	Pct	Pct	g/cc	Cm/hr	Cm/cm	Pct	Pct
GsD:									
Gilpin	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
Sequoia	0-13	25	59	12-27	1.15-1.50	0.6-2	0.17-0.20	0.0-2.9	0.5-2.0
	13-50	16	48	27-60	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.0-0.5
	50-86	13	40	35-60	1.35-1.55	0.2-0.6	0.08-0.16	3.0-5.9	0.0-0.5
	86-111			---	---	0.00- 0.00	---	---	---
ItE:									
Itmann, unstable fill	0-10	30	45	8-28	1.00-1.30	2-20	0.05-0.12	0.0-2.9	0.0-0.5
	10-200	35	40	8-28	1.00-1.30	2-20	0.05-0.12	0.0-2.9	0.0-0.1
LdB:									
Lily	0-25	45	33	7-27	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	56	18	18-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	67	20	7-18	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
LdC:									
Lily	0-25	45	33	7-27	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	56	18	18-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	67	20	7-18	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
LdD:									
Lily	0-25	45	33	7-27	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	56	18	18-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	67	20	7-18	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
LgC:									
Lily	0-25	72	18	7-20	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	56	18	18-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	67	20	7-18	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
Gilpin	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
LgD:									
Lily	0-25	72	18	7-20	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	56	18	18-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	67	20	7-18	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
Gilpin	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---

Table 19.—Physical Soil Properties, Part I—Continued

Map symbol and soil name	Depth	Sand rv	Silt rv	Clay range	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter
	Cm	Pct	Pct	Pct	g/cc	Cm/hr	Cm/cm	Pct	Pct
LgE:									
Lily	0-25	72	18	7-20	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	56	18	18-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	67	20	7-18	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
Gilpin	0-18	35	52	5-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	0.5-4.0
	18-58	30	49	18-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.2-1.0
	58-84	20	45	18-40	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.0-0.5
	84-109			---	---	0.00- 0.00	---	---	---
LmC:									
Lily	0-25	72	18	7-20	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	71	16	7-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	58	17	7-35	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
Ramsey	0-10	45	39	8-25	1.25-1.50	6-20	0.09-0.12	0.0-2.9	0.5-2.0
	10-25	65	19	8-25	1.20-1.40	6-20	0.09-0.12	0.0-2.9	0.0-0.5
	25-41	70	18	8-25	1.30-1.60	2-6	0.09-0.15	0.0-2.9	0.0-0.5
	41-66			---	---	0.00-0.2	---	---	---
LmD:									
Lily	0-25	72	18	7-20	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	71	16	7-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	58	17	7-35	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
Ramsey	0-10	45	39	8-25	1.25-1.50	6-20	0.09-0.12	0.0-2.9	0.5-2.0
	10-25	65	19	8-25	1.20-1.40	6-20	0.09-0.12	0.0-2.9	0.0-0.5
	25-41	70	18	8-25	1.30-1.60	2-6	0.09-0.15	0.0-2.9	0.0-0.5
	41-66			---	---	0.00-0.2	---	---	---
LmE:									
Lily	0-25	72	18	7-20	1.20-1.40	2-6	0.09-0.16	0.0-2.9	0.5-4.0
	25-56	71	16	7-35	1.25-1.35	2-6	0.12-0.18	0.0-2.9	0.5-2.0
	56-76	58	17	7-35	1.40-1.55	2-6	0.10-0.16	0.0-2.9	0.0-0.5
	76-101			---	---	0.00- 0.00	---	---	---
Ramsey	0-10	45	39	8-25	1.25-1.50	6-20	0.09-0.12	0.0-2.9	0.5-2.0
	10-25	65	19	8-25	1.20-1.40	6-20	0.09-0.12	0.0-2.9	0.0-0.5
	25-41	70	18	8-25	1.30-1.60	2-6	0.09-0.15	0.0-2.9	0.0-0.5
	41-66			---	---	0.00-0.2	---	---	---
LoB:									
Lonewood	0-20	26	56	12-27	1.30-1.40	0.6-2	0.18-0.20	0.0-2.9	1.0-3.0
	20-71	17	58	18-35	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5
	71-150	35	33	27-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5
	150-175			---	---	0.00- 0.00	---	---	---
LoC:									
Lonewood	0-20	26	56	12-27	1.30-1.40	0.6-2	0.18-0.20	0.0-2.9	1.0-3.0
	20-71	17	58	18-35	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5
	71-150	35	33	27-40	1.40-1.55	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5
	150-175			---	---	0.00- 0.00	---	---	---

Table 19.—Physical Soil Properties, Part I—Continued

Map symbol and soil name	Depth	Sand rv	Silt rv	Clay range	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter
	Cm	Pct	Pct	Pct	g/cc	Cm/hr	Cm/cm	Pct	Pct
Ps:									
Pope, frequently flooded	0-8	81	15	3-27	0.90-1.40	0.6-2	0.14-0.23	0.0-2.9	1.0-4.0
	8-58	91	5	3-27	1.30-1.80	0.6-6	0.10-0.18	0.0-2.9	0.0-0.5
	58-188	69	22	3-20	1.30-1.60	0.6-6	0.10-0.18	0.0-2.9	0.0-0.5
Skidmore, frequently flooded	0-8	68	20	5-15	1.20-1.40	2-20	0.07-0.15	0.0-2.9	1.0-3.0
	8-28	68	20	5-15	1.30-1.60	2-20	0.06-0.15	0.0-2.9	0.0-0.5
	28-86	83	9	5-10	1.35-1.55	6-20	0.04-0.09	0.0-2.9	0.0-0.5
	86-156	80	12	5-15	1.30-1.60	2-20	0.06-0.15	0.0-2.9	0.0-0.5
RaF:									
Rock outcrop.									
Ramsey	0-10	45	39	8-25	1.25-1.50	6-20	0.09-0.12	0.0-2.9	0.5-2.0
	10-25	65	19	8-25	1.20-1.40	6-20	0.09-0.12	0.0-2.9	0.0-0.5
	25-41	70	18	8-25	1.30-1.60	2-6	0.09-0.15	0.0-2.9	0.0-0.5
	41-66			---	---	0.00-0.2	---	---	---
SaC:									
Shelocta	0-23	29	47	10-27	1.15-1.30	0.6-2	0.10-0.18	0.0-2.9	0.5-5.0
	23-140	18	54	18-35	1.30-1.55	0.6-2	0.10-0.20	0.0-2.9	0.5-2.0
	140-193	21	55	15-35	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	0.0-0.5
SaD:									
Shelocta	0-23	29	47	10-27	1.15-1.30	0.6-2	0.10-0.18	0.0-2.9	0.5-5.0
	23-140	18	54	18-35	1.30-1.55	0.6-2	0.10-0.20	0.0-2.9	0.5-2.0
	140-193	21	55	15-35	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	0.0-0.5
SaE:									
Shelocta	0-23	29	47	10-27	1.15-1.30	0.6-2	0.10-0.18	0.0-2.9	0.5-5.0
	23-140	18	54	18-35	1.30-1.55	0.6-2	0.10-0.20	0.0-2.9	0.5-2.0
	140-193	21	55	15-35	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	0.0-0.5
SbF:									
Shelocta, extremely stony	0-23	29	47	10-27	1.15-1.30	0.6-2	0.10-0.18	0.0-2.9	0.5-5.0
	23-140	18	54	18-35	1.30-1.55	0.6-2	0.10-0.20	0.0-2.9	0.5-2.0
	140-193	21	55	15-35	1.30-1.55	0.6-6	0.08-0.16	0.0-2.9	0.0-0.5
Bouldin, extremely stony	0-15	54	35	3-26	1.23-1.38	2-6	0.06-0.10	0.0-2.9	1.0-4.0
	15-33	51	35	3-26	1.36-1.51	2-6	0.06-0.10	0.0-2.9	0.5-2.0
	33-203	45	36	8-35	1.55-1.69	2-6	0.06-0.10	0.0-2.9	0.0-0.5
Sk:									
Skidmore, frequently flooded	0-8	68	20	5-15	1.20-1.40	2-20	0.07-0.15	0.0-2.9	1.0-3.0
	8-28	68	20	5-15	1.30-1.60	2-20	0.06-0.15	0.0-2.9	0.0-0.5
	28-86	83	9	5-10	1.35-1.55	6-20	0.04-0.09	0.0-2.9	0.0-0.5
	86-156	80	12	5-15	1.30-1.60	2-20	0.06-0.15	0.0-2.9	0.0-0.5
W.									
Water									

Table 19.—Physical Soil Properties, Part I—Continued

Map symbol and soil name	Depth	Sand rv	Silt rv	Clay range	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter
	Cm	Pct	Pct	Pct	g/cc	Cm/hr	Cm/cm	Pct	Pct
WnB:									
Wernock----------	0-30	12	69	12-27	1.20-1.40	0.6-2	0.19-0.23	0.0-2.9	0.5-4.0
	30-69	6	62	18-40	1.30-1.50	0.6-2	0.18-0.22	0.0-2.9	0.0-0.5
	69-89	6	60	27-40	1.30-1.50	0.6-2	0.18-0.22	0.0-2.9	0.0-0.5
	89-114			---	---	0.00- 0.00	---	---	---
WnC:									
Wernock----------	0-30	12	69	12-27	1.20-1.40	0.6-2	0.19-0.23	0.0-2.9	0.5-4.0
	30-69	6	62	18-40	1.30-1.50	0.6-2	0.18-0.22	0.0-2.9	0.0-0.5
	69-89	6	60	27-40	1.30-1.50	0.6-2	0.18-0.22	0.0-2.9	0.0-0.5
	89-114			---	---	0.00- 0.00	---	---	---

Table 19.—Physical Soil Properties, Part II

(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)

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	Cm					
Ak:						
Atkins, ponded	0-15	.32	.32	5	8	0
	15-117	.32	.32			
	117-157	.28	.32			
AyD:						
Atkins, occasionally flooded	0-15	.32	.32	5	8	0
	15-117	.32	.32			
	117-157	.28	.32			
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
Az:						
Atkins, frequently flooded	0-15	.32	.32	5	8	0
	15-117	.32	.32			
	117-157	.28	.32			
Skidmore, frequently flooded	0-8	.20	.24	3	8	0
	8-28	.17	.28			
	28-86	.17	.28			
	86-156	.17	.28			
GaC:						
Gilpin	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
GaD:						
Gilpin	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
GbF:						
Gilpin, stony	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
Bouldin, very stony	0-15	.20	.28	5	8	0
	15-33	.20	.28			
	33-203	.20	.28			

Table 19.—Physical Soil Properties, Part II—Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	Cm					
GdF:						
Gilpin, stony-------	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
Bouldin, very stony-	0-15	.20	.28	5	8	0
	15-33	.20	.28			
	33-203	.20	.28			
Petros, stony-------	0-5	.20	.28	2	8	0
	5-20	.15	.24			
	20-41	.15	.24			
	41-66	---	---			
GpE:						
Gilpin--------------	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
Petros--------------	0-5	.20	.28	2	8	0
	5-20	.15	.24			
	20-41	.15	.24			
	41-66	---	---			
GpF:						
Gilpin--------------	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
Petros--------------	0-5	.20	.28	2	8	0
	5-20	.15	.24			
	20-41	.15	.24			
	41-66	---	---			
GsB:						
Gilpin--------------	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
Sequoia-------------	0-13	.37	.37	3	8	0
	13-50	.28	.28			
	50-86	.24	.28			
	86-111	---	---			
GsC:						
Gilpin--------------	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
Sequoia-------------	0-13	.37	.37	3	8	0
	13-50	.28	.28			
	50-86	.24	.28			
	86-111	---	---			

Table 19.—Physical Soil Properties, Part II—Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	Cm					
GsD:						
Gilpin	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
Sequoia	0-13	.37	.37	3	8	0
	13-50	.28	.28			
	50-86	.24	.28			
	86-111	---	---			
ItE:						
Itmann, unstable fill	0-10	.32	.37	5	8	0
	10-200	.32	.43			
LdB:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
LdC:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
LdD:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
LgC:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
Gilpin	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
LgD:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
Gilpin	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			

Table 19.—Physical Soil Properties, Part II—Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	Cm					
LgE:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
Gilpin	0-18	.32	.32	3	8	0
	18-58	.28	.28			
	58-84	.24	.49			
	84-109	---	---			
LmC:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
Ramsey	0-10	.20	.20	1	8	0
	10-25	.17	.20			
	25-41	.17	.20			
	41-66	---	---			
LmD:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
Ramsey	0-10	.20	.20	1	8	0
	10-25	.17	.20			
	25-41	.17	.20			
	41-66	---	---			
LmE:						
Lily	0-25	.28	.28	2	8	0
	25-56	.28	.28			
	56-76	.20	.20			
	76-101	---	---			
Ramsey	0-10	.20	.20	1	8	0
	10-25	.17	.20			
	25-41	.17	.20			
	41-66	---	---			
LoB:						
Lonewood	0-20	.37	.37	3	8	0
	20-71	.32	.32			
	71-150	.32	.32			
	150-175	---	---			
LoC:						
Lonewood	0-20	.37	.37	3	8	0
	20-71	.32	.32			
	71-150	.32	.32			
	150-175	---	---			

Table 19.—Physical Soil Properties, Part II—Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	Cm					
Ps:						
Pope, frequently flooded	0-8	.37	.37	5	8	0
	8-58	.28	.28			
	58-188	.28	.20			
Skidmore, frequently flooded	0-8	.20	.24	3	8	0
	8-28	.17	.28			
	28-86	.17	.28			
	86-156	.17	.28			
RaF:						
Rock outcrop.						
Ramsey	0-10	.20	.20	1	8	0
	10-25	.17	.20			
	25-41	.17	.20			
	41-66	---	---			
SaC:						
Shelocta	0-23	.32	.32	3	8	0
	23-140	.28	.32			
	140-193	.17	.28			
SaD:						
Shelocta	0-23	.32	.32	3	8	0
	23-140	.28	.32			
	140-193	.17	.28			
SaE:						
Shelocta	0-23	.32	.32	3	8	0
	23-140	.28	.32			
	140-193	.17	.28			
SbF:						
Shelocta, extremely stony	0-23	.32	.32	4	8	0
	23-140	.28	.32			
	140-193	.17	.28			
Bouldin, extremely stony	0-15	.20	.28	5	8	0
	15-33	.20	.28			
	33-203	.20	.28			
Sk:						
Skidmore, frequently flooded	0-8	.20	.24	5	8	0
	8-28	.17	.28			
	28-86	.17	.28			
	86-156	.17	.28			
W.						
Water					8	0

Table 19.—Physical Soil Properties, Part II—Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	Cm					
WnB:						
Wernock----------	0-30	.37	.37	3	8	0
	30-69	.32	.32			
	69-89	.32	.32			
	89-114	---	---			
WnC:						
Wernock----------	0-30	.37	.37	3	8	0
	30-69	.32	.32			
	69-89	.32	.32			
	89-114	---	---			

Table 20.—Chemical Soil Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	Cm	meq/100 g	meq/100 g	pH
Ak:				
Atkins, ponded	0-15	---	1.5-7.8	4.5-5.5
	15-117	---	5.4-18	4.5-5.5
	117-157	---	1.9-9.5	4.5-5.5
AyD:				
Atkins, occasionally flooded	0-15	---	1.5-7.8	4.5-5.5
	15-117	---	5.4-18	4.5-5.5
	117-157	---	1.9-9.5	4.5-5.5
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
Az:				
Atkins, frequently flooded	0-15	---	1.5-7.8	4.5-5.5
	15-117	---	5.4-18	4.5-5.5
	117-157	---	1.9-9.5	4.5-5.5
Skidmore, frequently flooded	0-8	1.9-5.6	---	5.6-7.0
	8-28	1.7-5.4	---	5.6-7.0
	28-86	1.7-3.6	---	5.6-7.0
	86-156	1.7-5.4	---	5.6-7.0
GaC:				
Gilpin	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
GaD:				
Gilpin	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
GbF:				
Gilpin, stony	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
Bouldin, very stony	0-15	---	1.0-3.8	4.5-5.5
	15-33	---	1.0-3.8	4.5-5.5
	33-203	---	1.0-4.7	4.5-5.5
GdF:				
Gilpin, stony	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---

Table 20.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	Cm	meq/100 g	meq/100 g	pH
GdF:				
Bouldin, very stony--	0-15	---	1.0-3.8	4.5-5.5
	15-33	---	1.0-3.8	4.5-5.5
	33-203	---	1.0-4.7	4.5-5.5
Petros, stony--------	0-5	---	1.2-5.3	4.5-5.5
	5-20	---	3.3-7.2	4.5-5.5
	20-41	---	2.3-8.4	4.5-5.5
	41-66	---	---	---
GpE:				
Gilpin---------------	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
Petros---------------	0-5	---	1.2-5.3	4.5-5.5
	5-20	---	3.3-7.2	4.5-5.5
	20-41	---	2.3-8.4	4.5-5.5
	41-66	---	---	---
GpF:				
Gilpin---------------	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
Petros---------------	0-5	---	1.2-5.3	4.5-5.5
	5-20	---	3.3-7.2	4.5-5.5
	20-41	---	2.3-8.4	4.5-5.5
	41-66	---	---	---
GsB:				
Gilpin---------------	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
Sequoia--------------	0-13	4.3-9.8	---	4.5-6.8
	13-50	---	5.3-15	4.5-5.5
	50-86	---	6.9-15	4.5-5.5
	86-111	---	---	---
GsC:				
Gilpin---------------	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
Sequoia--------------	0-13	4.3-9.8	---	4.5-6.8
	13-50	---	5.3-15	4.5-5.5
	50-86	---	6.9-15	4.5-5.5
	86-111	---	---	---

Table 20.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	Cm	meq/100 g	meq/100 g	pH
GsD:				
Gilpin	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
Sequoia	0-13	4.3-9.8	---	4.5-6.8
	13-50	---	5.3-15	4.5-5.5
	50-86	---	6.9-15	4.5-5.5
	86-111	---	---	---
ItE:				
Itmann, unstable fill	0-10	---	0.7-7.0	2.5-5.5
	10-200	---	0.8-7.0	2.5-5.5
LdB:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
LdC:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
LdD:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
LgC:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
Gilpin	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
LgD:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
Gilpin	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---

Table 20.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	Cm	meq/100 g	meq/100 g	pH
LgE:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
Gilpin	0-18	---	2.8-9.1	3.6-5.5
	18-58	---	5.3-13	3.6-5.5
	58-84	---	5.7-21	3.6-5.5
	84-109	---	---	---
LmC:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
Ramsey	0-10	---	1.0-3.6	4.5-6.0
	10-25	---	0.7-3.6	4.5-6.0
	25-41	---	0.7-3.6	4.5-6.0
	41-66	---	---	---
LmD:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
Ramsey	0-10	---	1.0-3.6	4.5-6.0
	10-25	---	0.7-3.6	4.5-6.0
	25-41	---	0.7-3.6	4.5-6.0
	41-66	---	---	---
LmE:				
Lily	0-25	---	1.1-3.9	3.6-5.5
	25-56	---	3.2-6.9	3.6-5.5
	56-76	---	1.3-4.2	4.5-5.5
	76-101	---	---	---
Ramsey	0-10	---	1.0-3.6	4.5-6.0
	10-25	---	0.7-3.6	4.5-6.0
	25-41	---	0.7-3.6	4.5-6.0
	41-66	---	---	---
LoB:				
Lonewood	0-20	---	2.0-5.1	4.5-5.5
	20-71	---	3.5-8.4	4.5-5.5
	71-150	---	5.3-9.7	4.5-5.5
	150-175	---	---	---
LoC:				
Lonewood	0-20	---	2.0-5.1	4.5-5.5
	20-71	---	3.5-8.4	4.5-5.5
	71-150	---	5.3-9.7	4.5-5.5
	150-175	---	---	---

Table 20.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	Cm	meq/100 g	meq/100 g	pH
Ps:				
Pope, frequently flooded	0-8	---	1.5-8.4	3.6-5.5
	8-58	---	1.3-13	3.6-5.5
	58-188	---	1.3-9.5	3.6-5.5
Skidmore, frequently flooded	0-8	1.9-5.6	---	5.6-7.0
	8-28	1.7-5.4	---	5.6-7.0
	28-86	1.7-3.6	---	5.6-7.0
	86-156	1.7-5.4	---	5.6-7.0
RaF:				
Rock outcrop.				
Ramsey	0-10	---	1.0-3.6	4.5-6.0
	10-25	---	0.7-3.6	4.5-6.0
	25-41	---	0.7-3.6	4.5-6.0
	41-66	---	---	---
SaC:				
Shelocta	0-23	---	2.2-9.1	4.5-5.5
	23-140	---	4.9-12	4.5-5.5
	140-193	---	4.6-18	4.5-5.5
SaD:				
Shelocta	0-23	---	2.2-9.1	4.5-5.5
	23-140	---	4.9-12	4.5-5.5
	140-193	---	4.6-18	4.5-5.5
SaE:				
Shelocta	0-23	---	2.2-9.1	4.5-5.5
	23-140	---	4.9-12	4.5-5.5
	140-193	---	4.6-18	4.5-5.5
SbF:				
Shelocta, extremely stony	0-23	---	2.2-9.1	4.5-5.5
	23-140	---	4.9-12	4.5-5.5
	140-193	---	4.6-18	4.5-5.5
Bouldin, extremely stony	0-15	---	1.0-3.8	4.5-5.5
	15-33	---	1.0-3.8	4.5-5.5
	33-203	---	1.0-4.7	4.5-5.5
Sk:				
Skidmore, frequently flooded	0-8	1.9-5.6	---	5.6-7.0
	8-28	1.7-5.4	---	5.6-7.0
	28-86	1.7-3.6	---	5.6-7.0
	86-156	1.7-5.4	---	5.6-7.0
W.				
Water				

Table 20.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	Cm	meq/100 g	meq/100 g	pH
WnB:				
Wernock	0-30	---	2.0-5.3	3.6-7.3
	30-69	---	3.5-9.7	3.6-6.0
	69-89	---	5.3-9.7	3.6-6.0
	89-114	---	---	---
WnC:				
Wernock	0-30	---	2.0-5.3	3.6-7.3
	30-69	---	3.5-9.7	3.6-6.0
	69-89	---	5.3-9.7	3.6-6.0
	89-114	---	---	---

Table 21.—Water Features

(Depths of layers are in meters. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Month	Water table		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Meters	Meters	Meters				
Ak:									
Atkins, ponded	D								
		January	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		February	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		March	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		April	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		May	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		June	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		July	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		August	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		September	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		October	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		November	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
		December	0.0-0.3	>2.0	0.1-0.6	Very long	Frequent	---	None
AyD:									
Atkins, occasionally flooded	D								
		January	0.0-0.3	>2.0	---	---	None	Brief	Occasional
		February	0.0-0.3	>2.0	---	---	None	Brief	Occasional
		March	0.0-0.3	>2.0	---	---	None	Brief	Occasional
		April	0.0-0.3	>2.0	---	---	None	Brief	Occasional
		December	0.0-0.3	>2.0	---	---	None	Brief	Occasional
Lily	B								
		Jan-Dec	---	---	---	---	None	---	None
Az:									
Atkins, frequently flooded	D								
		January	0.0-0.3	>2.0	---	---	None	Brief	Frequent
		February	0.0-0.3	>2.0	---	---	None	Brief	Frequent
		March	0.0-0.3	>2.0	---	---	None	Brief	Frequent
		April	0.0-0.3	>2.0	---	---	None	Brief	Frequent
		December	0.0-0.3	>2.0	---	---	None	Brief	Frequent
Skidmore, frequently flooded	B								
		January	1.5-2.0	>2.0	---	---	None	---	Rare
		February	1.5-2.0	>2.0	---	---	None	---	Rare
		March	1.5-2.0	>2.0	---	---	None	---	Rare
		April	1.5-2.0	>2.0	---	---	None	---	Rare
		May	1.5-2.0	>2.0	---	---	None	---	Rare
		November	---	---	---	---	None	---	Rare
		December	1.5-2.0	>2.0	---	---	None	---	Rare
GaC:									
Gilpin	C								
		Jan-Dec	---	---	---	---	None	---	None

Table 21.—Water Features—Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Meters	Meters	Meters				
GaD:									
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
GbF:									
Gilpin, stony	C	Jan-Dec	---	---	---	---	None	---	None
Bouldin, very stony	B	Jan-Dec	---	---	---	---	None	---	None
GdF:									
Gilpin, stony	C	Jan-Dec	---	---	---	---	None	---	None
Bouldin, very stony	B	Jan-Dec	---	---	---	---	None	---	None
Petros, stony	D	Jan-Dec	---	---	---	---	None	---	None
GpE:									
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
Petros	D	Jan-Dec	---	---	---	---	None	---	None
GpF:									
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
Petros	D	Jan-Dec	---	---	---	---	None	---	None
GsB:									
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
Sequoia	C	Jan-Dec	---	---	---	---	None	---	None
GsC:									
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
Sequoia	C	Jan-Dec	---	---	---	---	None	---	None
GsD:									
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
Sequoia	C	Jan-Dec	---	---	---	---	None	---	None

Table 21.—Water Features—Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Meters	Meters	Meters				
ItE:									
Itmann, unstable fill	C	Jan-Dec	---	---	---	---	None	---	None
LdB:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
LdC:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
LdD:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
LgC:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
LgD:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
LgE:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
Gilpin	C	Jan-Dec	---	---	---	---	None	---	None
LmC:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
Ramsey	D	Jan-Dec	---	---	---	---	None	---	None
LmD:									
Lily	B	Jan-Dec	---	---	---	---	None	---	None
Ramsey	D	Jan-Dec	---	---	---	---	None	---	None

Table 21.—Water Features—Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Meters	Meters	Meters				
LmE:									
Lily	B								
		Jan-Dec	---	---	---	---	None	---	None
Ramsey	D								
		Jan-Dec	---	---	---	---	None	---	None
LoB:									
Lonewood	B								
		Jan-Dec	---	---	---	---	None	---	None
LoC:									
Lonewood	B								
		Jan-Dec	---	---	---	---	None	---	None
Ps:									
Pope, frequently flooded	B								
		January	1.5-1.8	>2.0	---	---	None	Very brief	Frequent
		February	1.5-1.8	>2.0	---	---	None	Very brief	Frequent
		March	1.5-1.8	>2.0	---	---	None	Very brief	Frequent
		April	1.5-1.8	>2.0	---	---	None	Very brief	Frequent
		May	1.5-1.8	>2.0	---	---	None	Very brief	Frequent
		November	1.5-1.8	>2.0	---	---	None	Very brief	Frequent
		December	1.5-1.8	>2.0	---	---	None	Very brief	Frequent
Skidmore, frequently flooded	B								
		January	1.5-2.0	>2.0	---	---	None	Very brief	Frequent
		February	1.5-2.0	>2.0	---	---	None	Very brief	Frequent
		March	1.5-2.0	>2.0	---	---	None	Very brief	Frequent
		April	1.5-2.0	>2.0	---	---	None	Very brief	Frequent
		May	1.5-2.0	>2.0	---	---	None	Very brief	Frequent
		November	---	---	---	---	None	Very brief	Frequent
		December	1.5-2.0	>2.0	---	---	None	Very brief	Frequent
RaF:									
Rock outcrop.									
Ramsey	D								
		Jan-Dec	---	---	---	---	None	---	None
SaC:									
Shelocta	B								
SaD:									
Shelocta	B								
		Jan-Dec	---	---	---	---	None	---	None
SaE:									
Shelocta	B								
		Jan-Dec	---	---	---	---	None	---	None

Table 21.—Water Features—Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Meters	Meters	Meters				
SbF:									
Shelocta, extremely stony	B								
		Jan-Dec	---	---	---	---	None	---	None
Bouldin, extremely stony	B								
		Jan-Dec	---	---	---	---	None	---	None
Sk:									
Skidmore, frequently flooded	B								
		January	1.2-1.5	>2.0	---	---	None	Very brief	Frequent
		February	1.2-1.5	>2.0	---	---	None	Very brief	Frequent
		March	1.2-1.5	>2.0	---	---	None	Very brief	Frequent
		April	1.2-1.5	>2.0	---	---	None	Very brief	Frequent
		May	---	---	---	---	None	Very brief	Frequent
		December	1.2-1.5	>2.0	---	---	None	Very brief	Frequent
W.									
Water									
WnB:									
Wernock	B								
		Jan-Dec	---	---	---	---	None	---	None
WnC:									
Wernock	B								
		Jan-Dec	---	---	---	---	None	---	None

Table 22.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that data were not populated. Components with no data in all columns will not display. Depths are in metric)

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		cm				
Ak:						
Atkins, ponded	No restriction	---	---	None	High	Moderate
AyD:						
Atkins, occasionally flooded	No restriction	---	---	None	High	Moderate
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
Az:						
Atkins, frequently flooded	No restriction	---	---	None	High	Moderate
Skidmore, frequently flooded	No restriction	---	---	None	Moderate	Moderate
GaC:						
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
GaD:						
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
GbF:						
Gilpin, stony	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
Bouldin, very stony	No restriction	---	---	None	Low	Moderate
GdF:						
Gilpin, stony	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
Bouldin, very stony	No restriction	---	---	None	Low	Moderate
Petros, stony	Paralithic bedrock	25-51	Strongly cemented	None	Low	Moderate
GpE:						
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
Petros	Paralithic bedrock	25-51	Strongly cemented	None	Low	Moderate

Table 22.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		cm				
GpF:						
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
Petros	Paralithic bedrock	25-51	Strongly cemented	None	Low	Moderate
GsB:						
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
Sequoia	Paralithic bedrock	51-102	Strongly cemented	None	High	Moderate
GsC:						
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
Sequoia	Paralithic bedrock	51-102	Strongly cemented	None	High	Moderate
GsD:						
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
Sequoia	Paralithic bedrock	51-102	Strongly cemented	None	High	Moderate
ItE:						
Itmann, unstable fill	No restriction	---	---	None	High	High
LdB:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
LdC:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
LdD:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
LgC:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High

Table 22.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		cm				
LgD:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
LgE:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
Gilpin	Paralithic bedrock	51-102	Strongly cemented	None	Low	High
LmC:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
Ramsey	Lithic bedrock	18-51	Indurated	None	Low	Moderate
LmD:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
Ramsey	Lithic bedrock	18-51	Indurated	None	Low	Moderate
LmE:						
Lily	Lithic bedrock	51-102	Indurated	None	Moderate	High
Ramsey	Lithic bedrock	18-51	Indurated	None	Low	Moderate
LoB:						
Lonewood	Paralithic bedrock	102-183	Strongly cemented	None	Low	Moderate
LoC:						
Lonewood	Paralithic bedrock	102-183	Strongly cemented	None	Low	Moderate
Ps:						
Pope, frequently flooded	No restriction	---	---	None	Low	High
Skidmore, frequently flooded	No restriction	---	---	None	Moderate	Moderate
RaF:						
Ramsey	Lithic bedrock	18-51	Indurated	None	Low	Moderate
SaC:						
Shelocta	No restriction	---	---	None	Low	High
SaD:						
Shelocta	No restriction	---	---	None	Low	High

Table 22.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		cm				
SaE:						
Shelocta	No restriction	---	---	None	Low	High
SbF:						
Shelocta, extremely stony	No restriction	---	---	None	Low	High
Bouldin, extremely stony	No restriction	---	---	None	Low	Moderate
Sk:						
Skidmore, frequently flooded	No restriction	---	---	None	High	Low
WnB:						
Wernock	Paralithic bedrock	76-102	Strongly cemented	None	Moderate	High
WnC:						
Wernock	Paralithic bedrock	76-102	Strongly cemented	None	Moderate	High

Table 23.—Taxonomic Classification of the Soils

Soil name	Family or higher taxonomic class
Atkins	Fine-loamy, mixed, active, acid, mesic Fluvaquentic Endoaquepts
Bouldin	Loamy-skeletal, siliceous, semiactive, mesic Typic Paleudults
Gilpin	Fine-loamy, mixed, active, mesic Typic Hapludults
Itmann	Loamy-skeletal, mixed, semiactive, acid, mesic Typic Udorthents
Lily	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Lonewood	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Petros	Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts
Pope	Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
Ramsey	Loamy, siliceous, subactive, mesic Lithic Dystrudepts
Sequoia	Fine, mixed, semiactive, mesic Typic Hapludults
Shelocta	Fine-loamy, mixed, active, mesic Typic Hapludults
Skidmore	Loamy-skeletal, mixed, semiactive, mesic Dystric Fluventic Eutrudepts
Wernock	Fine-silty, mixed, semiactive, mesic Typic Hapludults

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