United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Missouri Department of Natural Resources, Missouri Agricultural Experiment Station, and Missouri Department of Conservation

Soil Survey of Maries County, Missouri

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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.

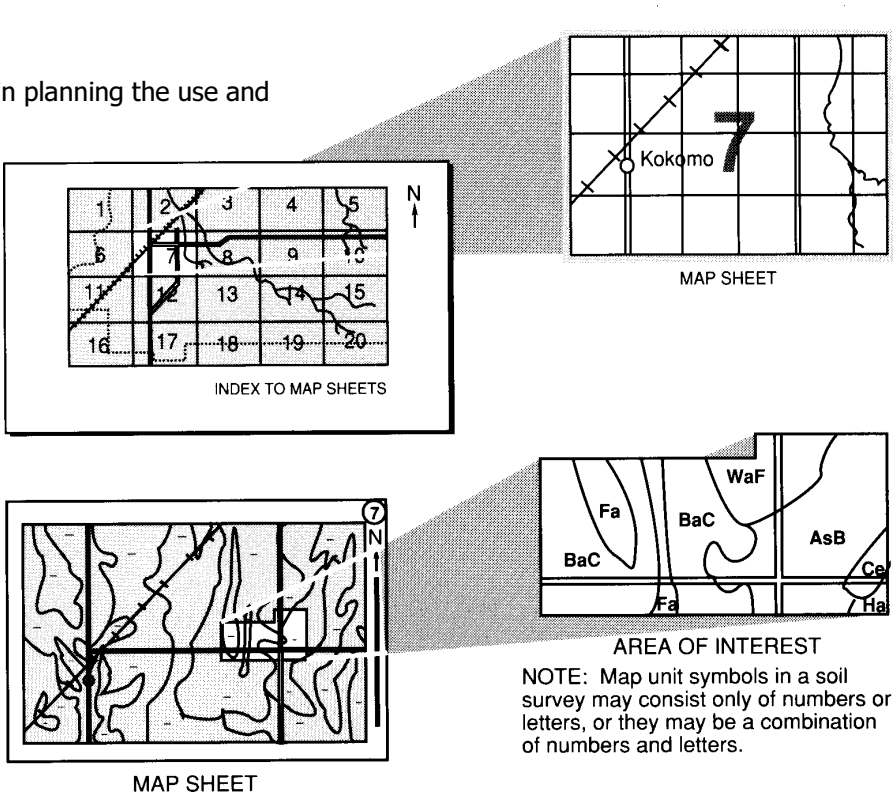
Detailed Soil Maps

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 turn to that sheet.

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

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



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

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

Major fieldwork for this soil survey was completed in 1999. Soil names and descriptions were approved in 1999. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1999. This survey was made cooperatively by the Natural Resources Conservation Service, the Missouri Department of Natural Resources, the Missouri Agricultural Experiment Station, and the Missouri Department of Conservation. The survey is part of the technical assistance furnished to the Maries County Soil and Water Conservation District. Financial assistance was made available by the Missouri Department of Natural Resources.

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

Cover: The Gasconade River, which runs through areas of the Rueter-Union association, provides recreational opportunities and a scenic look at the more rugged portion of Maries County.

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

Contents

Foreword

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

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

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

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

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

Roger A. Hansen
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Maries County, Missouri

By Keith O. Davis, Natural Resources Conservation Service

Fieldwork by Keith O. Davis, Natural Resources Conservation Service, and Wyn A. Kelley and Bradley B. Berhorst, Missouri Department of Natural Resources

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
Missouri Department of Natural Resources, Missouri Agricultural Experiment Station, Maries County Soil and Water Conservation District, and Missouri Department of Conservation

Maries County is in east-central Missouri, on the northern edge of the Ozark region (fig. 1). The county has a land area of 338,970 acres, or about 528 square miles.

Maries County is bordered on the north by Osage County, on the east by Phelps and Gasconade Counties, on the south by Phelps and Pulaski Counties, and on the west by Miller County. Vienna, which had a population of 611 in 1990, is the county seat. The population of the entire county in 1990 was 7,976 (U.S. Department of Commerce, 1992).

Farming is the main enterprise in Maries County. Light industry and tourism also contribute significantly to the economy.

Figure 1.—Location of Maries County in Missouri.

General Nature of the County

This section provides some general information about Maries County. It describes climate; history and development; water supply; and physiography, relief, and drainage.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Vienna in the period 1962 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 31.7 degrees F and the average daily minimum temperature is 20.6 degrees. The lowest temperature on record, which occurred on December 23, 1989, is -27 degrees. In summer, the average temperature is 75 degrees and the average daily maximum temperature is 87.5 degrees. The highest recorded temperature, which occurred on July 31, 1980, is 110 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the

average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 41.76 inches. Of this, 23.44 inches, or about 56 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 5.50 inches on December 3, 1982. Thunderstorms occur on about 52 days each year, and most occur from May to August.

The average seasonal snowfall is about 18.6 inches. The greatest snow depth at any one time during the period of record was 15 inches. On the average, 21 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 66 percent of the time possible in summer and 49 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in March.

History and Development

Maries County, in the Ozarks of Missouri, was organized in 1855. It was named for the Big and Little Maries Rivers. The territory was ceded by the Osage Indians in 1808. Prior to that time, French trappers explored the area. Pioneers from the southern states and from other parts of Missouri came to the area in the 1820's. In the 1850's, German and Irish immigrants moved into the area (Anonymous, 1989).

Prehistoric Indian mounds and artifacts have been found along the county's rivers. An ancient Indian trail in the survey area later became a road between St. Louis and Springfield. In the 1820's, Shawnee and Delaware Indians had a village at Indian Ford on the Gasconade River. Paydown Spring was a site for early gristmills and a woolen mill (Anonymous, 1989).

Reuben Terril established Vienna, the county seat, on the watershed divide between the Osage and Gasconade Rivers in 1855 on 70 acres donated by William Shockley. The town was named Vienna as a compromise resulting from county Judge V.G. Latham's desire to have it named "Vie-Anna" in memory of a relative. The courthouse, the county's third, was built in 1943. Its walls have become art galleries featuring an extensive collection of local artists in a wide variety of media. A minor Union post occupied Vienna during the Civil War. After the war, lead was mined briefly in the 1870's and zinc in the 1880's (Anonymous, 1989).

Belle, the county's largest town, grew up along the route of the Chicago, Rock Island, and Pacific Railroad, built through a small portion of Maries County in 1904. The town of Vichy was established in 1880 near a mineral spring that served as a health spa (Anonymous, 1989).

Maries County has always been dependent primarily on agriculture for its economic base. However, many farmers now have other jobs to supplement their farming income. The county is significantly dependent on larger neighboring communities, such as Jefferson City and Rolla, for its economic base, as evidenced by the increasing number of people who work and trade there.

Water Supply

Many of the upland soils in Maries County are suitable for the construction of ponds and small reservoirs. Most of the water for livestock in the county is derived from these sources and from small creeks and springs. Most municipalities and rural residences get water from deep wells. The quality of surface water and ground water is variable. This survey can be an important tool in the maintenance and improvement of overall water quality. The Gasconade and Maries Rivers are the largest streams of consequence in the county.

Subsurface water sources are plentiful in Maries County because of the "karsted" landscape and underground stream networks that have developed through dissolution of the soluble bedrock. Several "losing" streams in the county also feed this subterranean network.

Numerous springs occur where this network reaches the surface. Where these springs are developed, they furnish an abundant and convenient water supply. Although it is widely assumed that spring water is pure, the quality of the water is determined by the surface conditions at the point where surface water enters the underground network and by the effectiveness of the soil and vegetation in filtering out contaminants. This soil survey, therefore, is a valuable tool in planning and implementing protection of ground-water resources.

The quality of surface water is dependent upon management conditions on the soil surface. Concentration of livestock (fig. 2) results in large amounts of animal waste on the surface of the soil. Intensive rainfall can flush this waste into streams and rivers. Filter strips, rotational grazing, and other management practices help to protect the quality of surface water.

Fig. 2.—A large number of hogs are produced in Maries County. Open feeding and farrowing necessitate special conservation efforts to guard against soil erosion and to protect water quality.

Physiography, Relief, and Drainage

The landscape pattern of Maries County is highly diverse. Highways 63 and 28 closely approximate the location of a winding ridgetop that divides the major watersheds in the county. To the west, tributaries flow to the Maries River and/or to other smaller tributaries that drain to the Osage River in neighboring counties. On the eastern side, most of the drainage is toward the Gasconade River. On the far eastern side of the county, water flows through tributaries that eventually flow to the Bourbeuse River.

The dominant landscape configuration between these rivers consists of moderately sloping to steep uplands dissected by flood plains along small streams.

In the eastern part of the county, broad plateaus occur on crests of the major divides.

The major flood plains in the county are along the Gasconade and Maries Rivers and their tributaries. Loamy and silty alluvium was deposited along these

rivers from periodic overflow. Gravelly basal deposits underlie alluvial soils along the smaller streams. Several losing streams occur in such streambeds, where they are underlain by the karsted portions of the Gasconade geologic formation. This formation, where exposed, is also rife with small caves and springs.

How This Survey Was Made

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

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

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

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

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

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

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

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

Table 1.--Temperature and Precipitation

(Recorded in the period 1962-90 at Vienna, Missouri)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	39.8	17.4	28.6	70	-15	4	1.77	0.74	2.76	4	5.6
February	44.8	21.8	33.3	74	-10	12	2.06	0.92	3.04	4	4.5
March	55.6	31.8	43.7	84	2	68	3.91	2.48	5.20	6	3.2
April	68.2	42.5	55.4	89	21	222	3.71	2.21	5.05	6	0.4
May	76.6	51.7	64.1	90	31	442	4.75	2.88	6.42	7	0.0
June	84.1	60.2	72.2	96	42	665	4.22	1.50	6.48	6	0.0
July	89.7	64.7	77.2	101	48	842	3.09	1.30	4.61	5	0.0
August	88.7	62.9	75.8	103	46	799	3.78	1.89	5.42	5	0.0
September	80.7	54.7	67.7	97	32	533	3.89	1.81	5.67	5	0.0
October	70.1	42.6	56.3	91	22	243	3.89	1.88	5.63	5	0.0
November	56.4	32.9	44.7	81	10	66	3.64	1.41	5.51	5	1.5
December	43.7	22.5	33.1	72	-9	11	3.06	1.25	4.59	5	3.4
Yearly:											
Average	66.5	42.2	54.3	---	---	---	---	---	---	---	---
Extreme	110	-27	---	104	-18	---	---	---	---	---	---
Total	---	---	---	---	---	3,907	41.76	32.37	48.29	63	18.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1962-90 at Vienna, Missouri)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 14	April 23	May 8
2 years in 10 later than--	April 9	April 18	May 3
5 years in 10 later than--	March 31	April 10	April 24
First freezing temperature in fall:			
1 year in 10 earlier than--	October 18	September 30	September 25
2 years in 10 earlier than--	October 23	October 6	September 30
5 years in 10 earlier than--	November 3	October 18	October 9

Table 3.--Growing Season

(Recorded in the period 1962-90 at Vienna, Missouri)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	198	170	150
8 years in 10	204	177	156
5 years in 10	216	190	167
2 years in 10	228	203	179
1 year in 10	234	210	185

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. These broad areas are called associations. Each association 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 association can occur in another but in a different pattern.

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

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

1. Union-Swiss Association

Extent of the association:

20 percent of the survey area

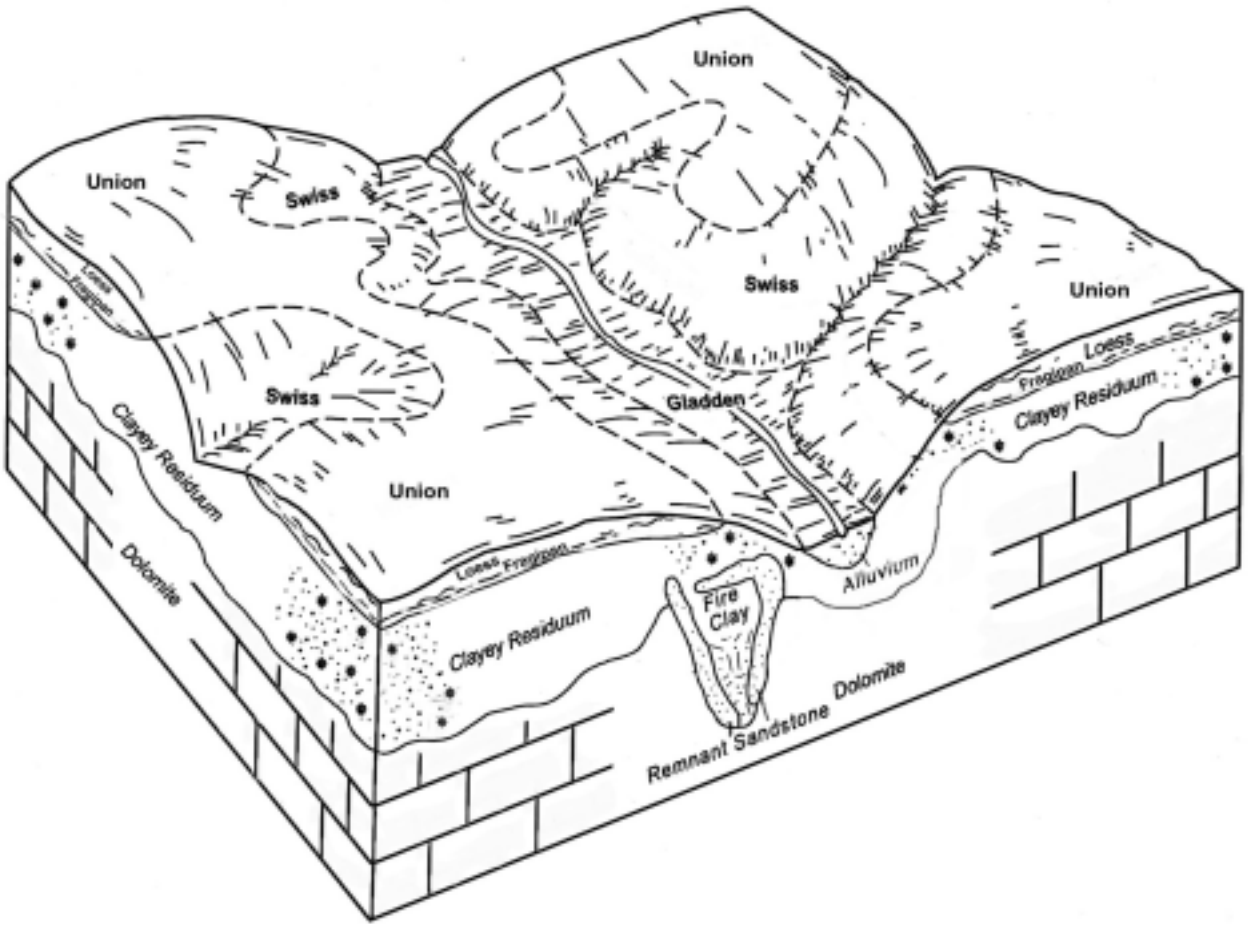


Figure 3.—Typical pattern of soils and parent material in the Union-Swiss association.

Composition:
Union and similar soils—57 percent
Swiss and similar soils—35 percent
Minor components—8 percent

Landscape:
Union—ridges
Swiss—narrow ridges and side slopes (fig. 3)

Parent material:
Loess and residuum

Slope range:
1 to 35 percent

Slope configuration:
Convex and complex

2. Gatewood-Gravois Association

Extent of the association:
34 percent of the survey area

Composition:
Gatewood and similar soils—57 percent
Gravois and similar soils—29 percent
Minor soils—14 percent

Landscape:
Gatewood—ridges and side slopes
Gravois—ridges and side slopes (fig. 4)

Parent material:
Loess and residuum

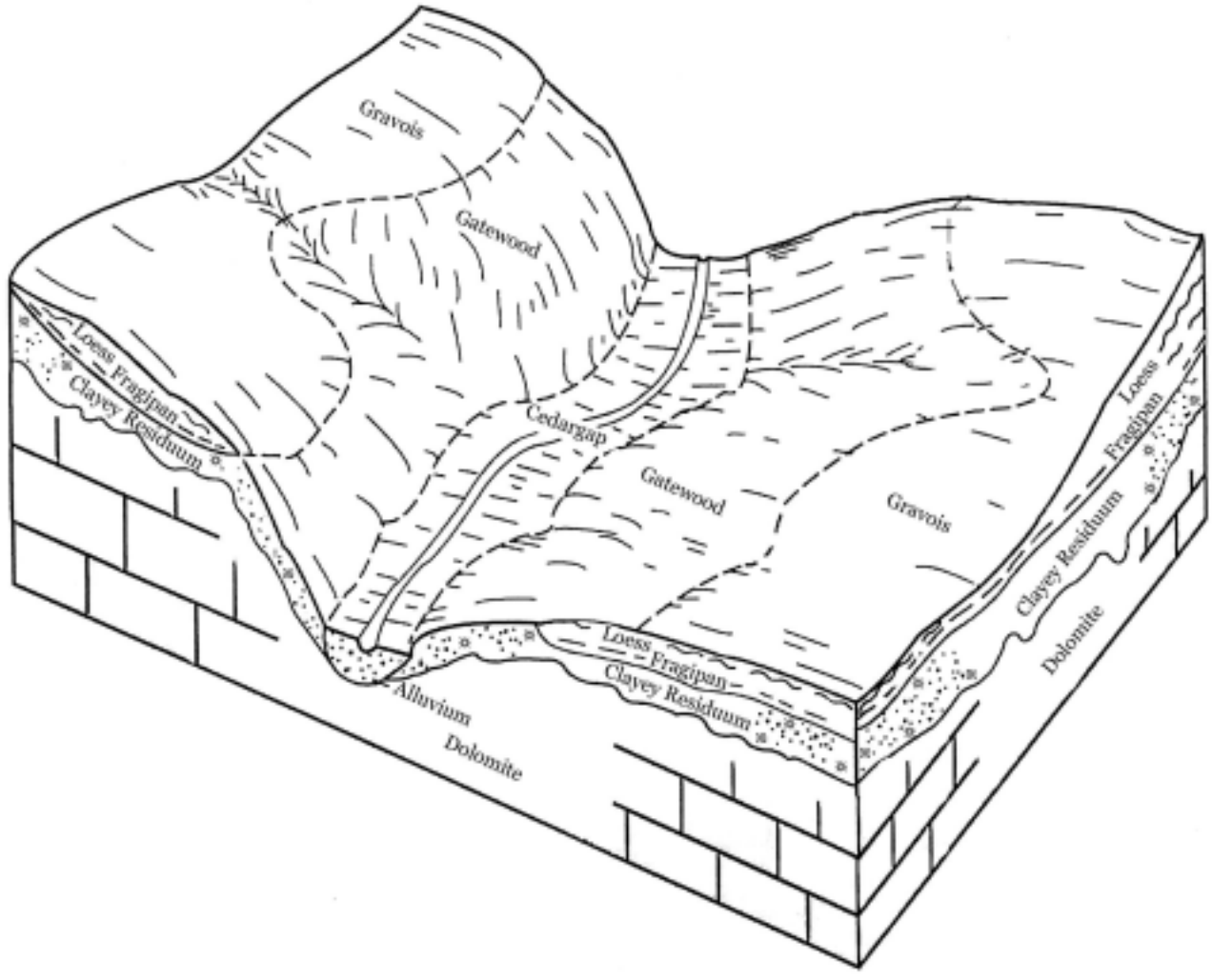


Figure 4.—Typical pattern of soils and parent material in the Gatewood-Gravois association.

Slope range:
3 to 35 percent

Slope configuration:
Convex and complex

3. Rueter-Union Association

Extent of the association:
28 percent of the survey area

Composition:
Rueter and similar soils—58 percent
Union and similar soils—36 percent
Minor soils—6 percent

Landscape:
Rueter—side slopes
Union—ridges (fig. 5)

Parent material:
Loess and residuum

Slope range:
1 to 35 percent

Slope configuration:
Convex and complex

4. Jamesfin-Cedargap-Racoon Association

Extent of the association:
12 percent of the survey area

Composition:
Jamesfin and similar soils—64 percent
Cedargap and similar soils—20 percent
Racoon and similar soils—14 percent
Water—2 percent

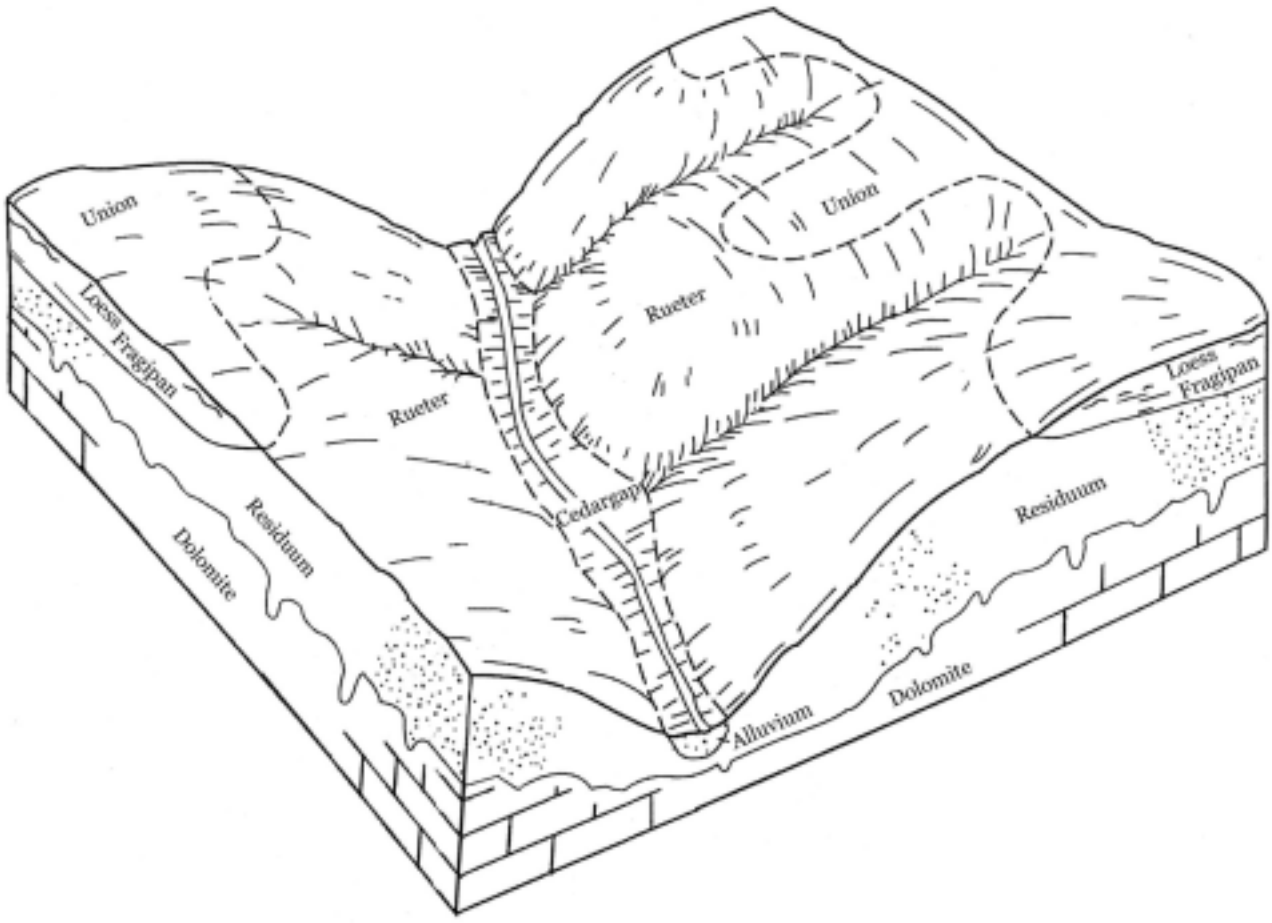


Figure 5.—Typical pattern of soils and parent material in the Rueter-Union association.

Landscape:
Jamesfin—flood plains and stream terraces
Cedargap—flood plains
Racoon—stream terraces (fig. 6)

Parent material:
Alluvium

Slope range:
0 to 3 percent

Slope configuration:
Linear and simple

5. Beemont-Gravois Association

Extent of the association:
5 percent of the survey area

Composition:
Beemont and similar soils—61 percent
Gravois and similar soils—38 percent
Minor components—1 percent

Landscape:
Beemont—side slopes and narrow ridges
Gravois—side slopes and ridges (fig. 7)

Parent material:
Loess and residuum

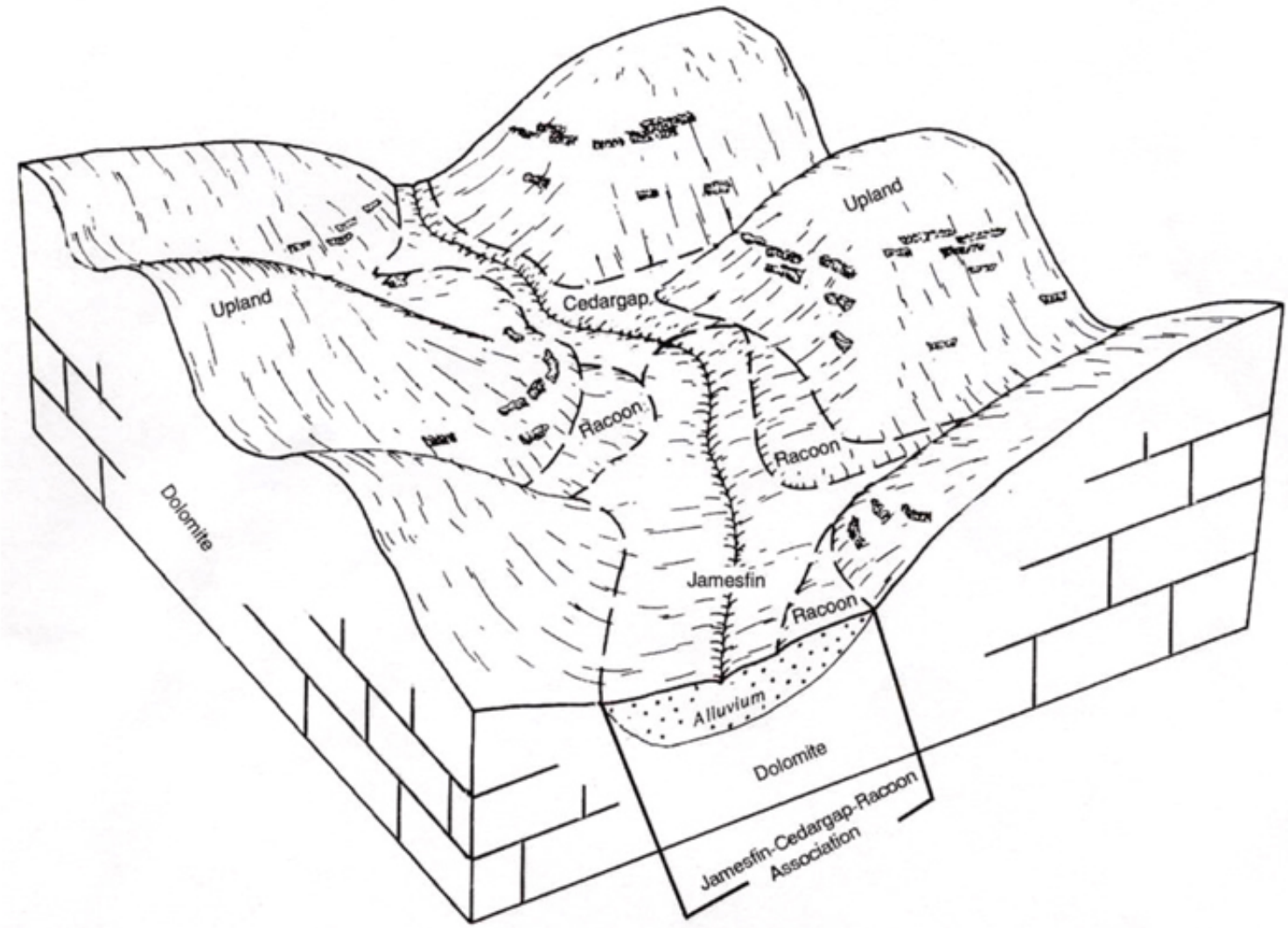


Figure 6.—Typical pattern of soils and parent material in the Jamesfin - Cedargap - Racoon association.

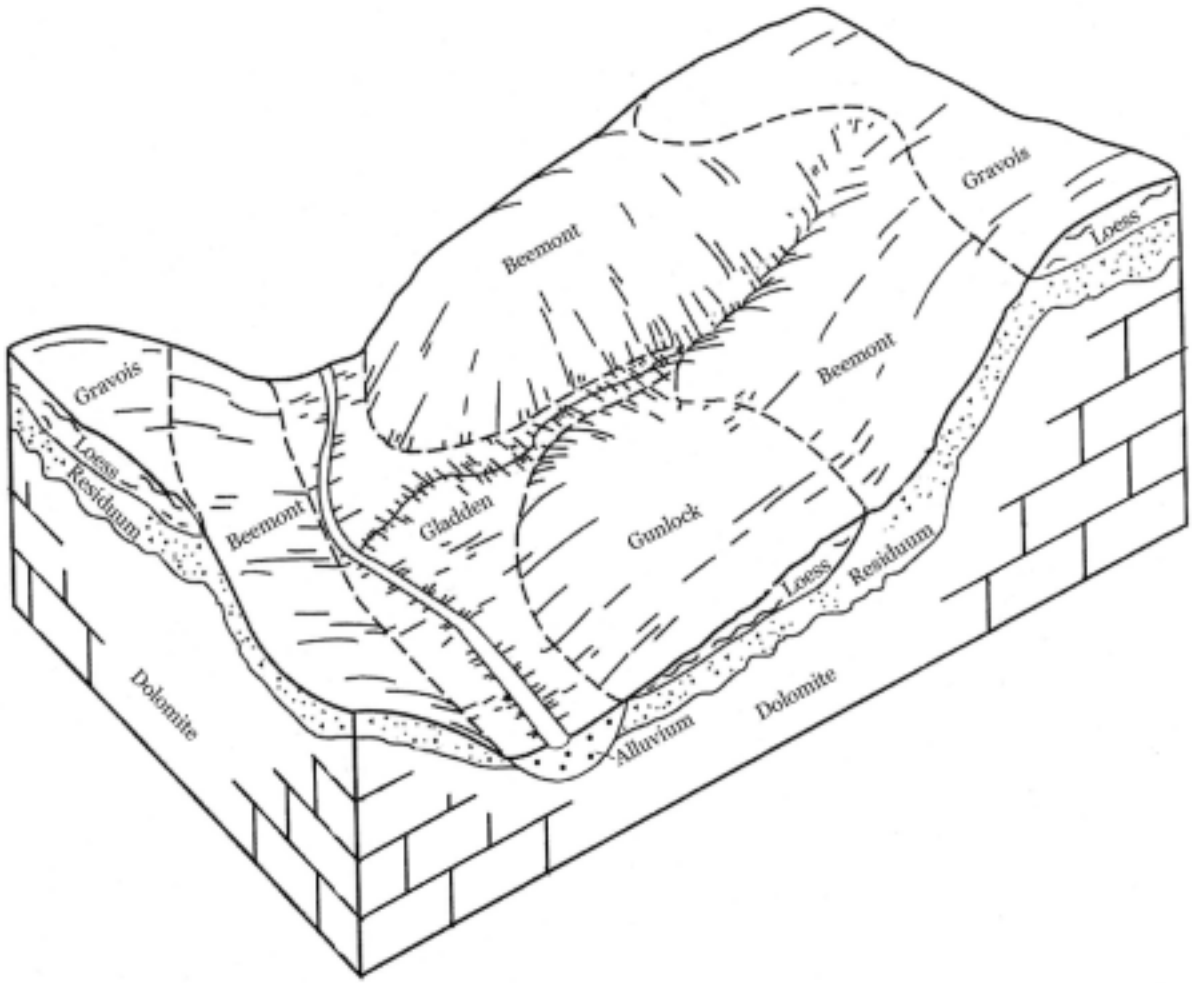


Figure 7.—Typical pattern of soils and parent material in the Beemont-Gravois association.

Slope range:
3 to 35 percent

Slope configuration:
Convex and complex

6. Mariosa Association

Extent of the association:
1 percent of the survey area

Composition:
Mariosa and similar soils—95 percent
Minor soils—5 percent

Landscape:
Broad ridges and side slopes (fig. 8)

Parent material:
Loess and residuum

Slope range:
0 to 3 percent

Slope configuration:
Linear and simple

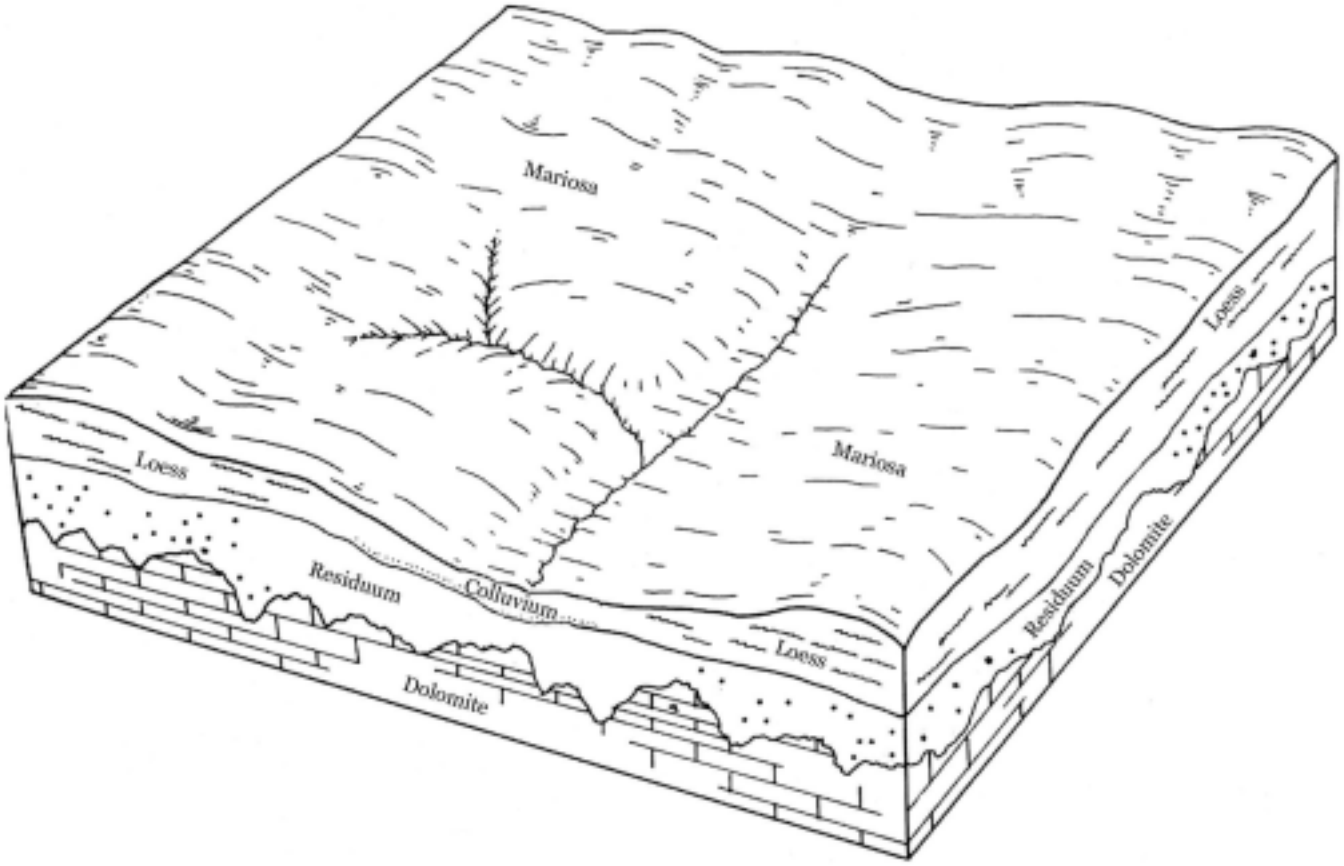


Figure 8.—Typical pattern of soils and parent material in the Mariosa association.

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

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

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

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Racoon silt loam, 0 to 3 percent slopes, rarely flooded, is a phase of the Racoon series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called 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. Moko-Rock outcrop complex, 15 to 50 percent slopes, very stony, is an example.

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

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the

soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

64000—Racoon silt loam, 0 to 3 percent slopes, rarely flooded

Setting

Landform: Stream terrace
Position on landform: Tread
Parent material: Fine-silty alluvium
Slope shape: Linear

Composition

Racoon and similar soils—90 percent
Minor components—10 percent
- Freeburg soils in convex areas
- Hacreek soils in the slightly lower areas
- Hartville soils at the upper edges of delineations
- Racoon soils that are occasionally flooded; at the slightly lower elevations

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Depth to restrictive feature: None
Flooding: Rare
Water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 6 inches; silt loam
Eg—6 to 26 inches; silt loam
Btg—26 to 60 inches; silty clay loam

64001—Freeburg silt loam, 0 to 3 percent slopes, rarely flooded

Setting

Landform: Stream terrace
Position on landform: Tread
Parent material: Fine-silty alluvium
Slope shape: Linear

Composition

Freeburg and similar soils—95 percent
Minor components—5 percent
- Hartville soils in the more sloping areas
- Freeburg soils that are occasionally flooded; in the slightly lower areas
- Jemerson soils in the slightly higher areas
- Racoon soils in depressional areas

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Depth to restrictive feature: None
Flooding: Rare
Water table: 12 to 30 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 9 inches; silt loam
B/A—9 to 13 inches; silt loam
Bt—13 to 52 inches; silt loam, silty clay loam
2BCg—52 to 80 inches; silty clay loam

66003—Jemerson silt loam, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Stream terrace
Position on landform: Tread
Parent material: Fine-silty alluvium
Slope shape: Linear

Composition

Jemerson and similar soils—85 percent
Minor components—15 percent
- Freeburg soils in depressional areas and in areas adjacent to uplands
- Jemerson soils that are occasionally flooded; in the slightly lower areas

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Depth to restrictive feature: None
Flooding: Rare
Water table: 42 to 60 inches
Drainage class: Well drained

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 50 inches; silt loam
2C—50 to 60 inches; gravelly loam

66005—Deible silt loam, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Stream terrace
Position on landform: Tread

Parent material: Alluvium and colluvium
Slope shape: Linear

Composition

Deible and similar soils—95 percent
Minor components—5 percent
- Hartville soils on the upper slopes adjacent to uplands
- Racoon soils in areas close to streams

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Depth to restrictive feature: Abrupt textural change—11 to 22 inches
Flooding: Rare
Water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 10 inches; silt loam
E—10 to 15 inches; silt loam
Btg1—15 to 37 inches; silty clay
2Btg2—37 to 80 inches; silty clay loam

70028—Moko-Rock outcrop complex, 3 to 15 percent slopes, very stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Moko—gravelly residuum derived from dolostone; Rock outcrop—no data
Slope shape: Convex

Composition

Moko and similar soils—80 percent
Rock outcrop—15 percent
Minor components—5 percent
- Gatewood soils in landform positions similar to those of the Moko soil
- Useful soils on the upper slopes
- Soils that have slopes of more than 15 percent
- Areas where the depth to bedrock is less than 4 inches

Soil Properties and Qualities

Depth to bedrock: Moko—very shallow and shallow (4 to 20 inches); Rock outcrop—no data
Runoff: Very high
Percent of surface covered by rock fragments: Moko—0.10 to 3 (subrounded stones); Rock outcrop—no data
Depth to restrictive feature (bedrock (lithic): Moko—4 to 20 inches; Rock outcrop—no data
Flooding: None
Water table: None
Drainage class: Moko—well drained; Rock outcrop—no data

Typical Profile

Moko

A1—0 to 3 inches; gravelly loam
A2—3 to 8 inches; very gravelly loam
R—8 to 60 inches; unweathered bedrock

70029—Moko-Rock outcrop complex, 15 to 50 percent slopes, very stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Moko—gravelly residuum derived from dolostone; Rock outcrop—no data
Slope shape: Convex

Composition

Moko and similar soils—80 percent
Rock outcrop—15 percent
Minor components—5 percent
- Gatewood soils on northeast aspects
- Areas that have slopes of more than 50 percent; adjacent to streams
- Areas that have slopes of less than 15 percent
- Areas where the depth to bedrock is less than 4 inches

Soil Properties and Qualities

Depth to bedrock: Moko—very shallow and shallow (4 to 20 inches); Rock outcrop—no data
Runoff: Very high
Percent of surface covered by rock fragments: Moko—0.10 to 3 (subrounded stones); Rock outcrop—no data
Depth to restrictive feature (bedrock (lithic): Moko—4 to 20 inches; Rock outcrop—no data
Flooding: None
Water table: None
Drainage class: Moko—well drained; Rock outcrop—no data

Typical Profile

Moko

A1—0 to 4 inches; gravelly clay loam

A2—4 to 7 inches; very channery clay loam
R—7 to 60 inches; unweathered bedrock

73012—Gravois silt loam, 3 to 8 percent slopes

Setting

Landform: Ridge
Position on landform: Summit and shoulder
Parent material: Fine-silty loess over gravelly residuum derived from dolostone
Slope shape: Convex

Composition

Gravois and similar soils—90 percent
Minor components—10 percent
Beemont soils in saddles and step-down areas
Union soils in landform positions similar to those of the Gravois soil
Useful soils on southwest aspects

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Depth to restrictive feature: Dense material—18 to 40 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 6 inches; silt loam
Bt—6 to 25 inches; silty clay loam
2Btx—25 to 35 inches; silty clay loam
3Bt1—35 to 50 inches; very gravelly silty clay loam
4Bt2—50 to 80 inches; very cobbly clay

73035—Gravois silt loam, 8 to 15 percent slopes

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Fine-silty loess over gravelly residuum derived from dolostone
Slope shape: Convex

Composition

Gravois and similar soils—90 percent
Minor components—10 percent
Beemont, Gatewood, and Rueter soils along drains
Useful soils on southwest aspects
Areas that have slopes of more than 15 percent

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Depth to restrictive feature: Dense material—18 to 40 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 6 inches; silt loam
Bt—6 to 25 inches; silty clay loam
2Btx—25 to 35 inches; silty clay loam
3Bt1—35 to 50 inches; very gravelly silty clay loam
4Bt2—50 to 80 inches; very cobbly clay

73088—Rueter very gravelly silt loam, 8 to 15 percent slopes, very stony

Setting

Landform: Hillside
Position on landform: Shoulder
Parent material: Gravelly colluvium over gravelly residuum derived from dolostone
Slope shape: Convex

Composition

Rueter and similar soils—85 percent
Minor components—15 percent
Union soils in the more stable areas
Other soils that have a fragipan

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Percent of surface covered by rock fragments: 0.10 to 3 (subrounded stones)
Depth to restrictive feature: None
Flooding: None
Water table: None
Drainage class: Somewhat excessively drained

Typical Profile

A—0 to 3 inches; very gravelly silt loam
E—3 to 14 inches; very gravelly silt loam
Bt1—14 to 45 inches; very gravelly loam, extremely cobbly loam
2Bt2—45 to 80 inches; extremely cobbly clay

73089—Rueter very gravelly silt loam, 15 to 35 percent slopes, very stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Gravelly colluvium over gravelly residuum derived from dolostone
Slope shape: Convex

Composition

Rueter and similar soils—85 percent
Minor components—15 percent
Cedargap soils along drains
Gravois soils on north aspects and in the more stable areas

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Percent of surface covered by rock fragments: 0.10 to 3 (subrounded stones)
Depth to restrictive feature: None
Flooding: None
Water table: None
Drainage class: Somewhat excessively drained

Typical Profile

A—0 to 3 inches; very gravelly silt loam
E—3 to 14 inches; very gravelly silt loam
Bt1—14 to 45 inches; very gravelly loam, extremely cobbly loam
2Bt2—45 to 80 inches; extremely cobbly clay

73090—Useful silt loam, 3 to 8 percent slopes

Setting

Landform: Hillside
Position on landform: Summit and backslope
Parent material: Loess over clayey residuum derived from dolostone
Slope shape: Convex

Composition

Useful and similar soils—90 percent
Minor components—10 percent
Gatewood soils on the lower slopes and on southwest aspects
Gravois soils on the upper slopes
Moko soils on southwest aspects

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff: Medium
Depth to restrictive feature: Bedrock (lithic)—40 to 60 inches
Flooding: None
Water table: 24 to 42 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 7 inches; silt loam
Bt1—7 to 31 inches; silty clay
2Bt2—31 to 45 inches; silty clay
2Bt3/2Cr—45 to 53 inches; silty clay loam
2R—53 to 60 inches; unweathered bedrock

73091—Useful silt loam, 8 to 15 percent slopes, eroded

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Loess over clayey residuum derived from dolostone
Slope shape: Convex

Composition

Useful and similar soils—90 percent
Minor components—10 percent
Gatewood soils on southwest aspects
Gravois soils in the less sloping areas
Moko soils on southwest aspects

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff: Medium
Depth to restrictive feature: Bedrock (lithic)—40 to 60 inches
Flooding: None
Water table: 24 to 42 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 7 inches; silt loam
Bt1—7 to 31 inches; silty clay
2Bt2—31 to 45 inches; silty clay
2Bt3/2Cr—45 to 53 inches; silty clay loam
2R—53 to 60 inches; unweathered bedrock

73092—Gatewood very gravelly silt loam, 3 to 8 percent slopes, stony

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Clayey residuum derived from dolostone
Slope shape: Convex

Composition

Gatewood and similar soils—90 percent
Minor components—10 percent
- Gatewood soils, that have a surface layer of silt loam, on summits and northeast aspects
- Moko soils on southwest aspects
- Useful soils on summits

Soil Properties and Qualities

Depth to bedrock: Moderately deep (20 to 40 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Bedrock (lithic)—20 to 40 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 2 inches; very gravelly silt loam
E—2 to 10 inches; very gravelly silt loam
2Bt—10 to 28 inches; clay
2R—28 to 60 inches; unweathered bedrock

73093—Gatewood very gravelly silt loam, 8 to 15 percent slopes, stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Clayey residuum derived from dolostone
Slope shape: Convex

Composition

Gatewood and similar soils—90 percent
Minor components—10 percent
- Beemont soils on the upper slopes
- Gatewood soils, that have a surface layer of silt loam, on northeast aspects
- Moko soils on southwest aspects
- Useful soils on northeast aspects and in the less sloping areas
- Areas that have slopes of more than 15 percent

Soil Properties and Qualities

Depth to bedrock: Moderately deep (20 to 40 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Bedrock (lithic)—20 to 40 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 2 inches; very gravelly silt loam
E—2 to 10 inches; very gravelly silt loam
2Bt—10 to 28 inches; clay
2R—28 to 60 inches; unweathered bedrock

73094—Gatewood very gravelly silt loam, 15 to 35 percent slopes, stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Clayey residuum derived from dolostone
Slope shape: Linear

Composition

Gatewood and similar soils—85 percent
Minor components—15 percent
- Beemont soils on the upper slopes
- Gatewood soils, that have a surface layer of silt loam, on northeast aspects
- Moko soils on southwest aspects
- Useful soils on northeast aspects and in the less sloping areas
- Areas that have slopes of less than 15 percent

Soil Properties and Qualities

Depth to bedrock: Moderately deep (20 to 40 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Bedrock (lithic)—20 to 40 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 2 inches; very gravelly silt loam
E—2 to 10 inches; very gravelly silt loam
2Bt—10 to 28 inches; clay
2R—28 to 60 inches; unweathered bedrock

73095—Gravois silt loam, 15 to 20 percent slopes

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Fine-silty loess over gravelly residuum derived from dolostone
Slope shape: Convex

Composition

Gravois and similar soils—90 percent
Minor components—10 percent
- Beemont, Gatewood, and Rueter soils along drains
- Areas that have slopes of more than 20 percent; along drains

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Depth to restrictive feature: Dense material—18 to 40 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 6 inches; silt loam
Bt—6 to 25 inches; silty clay loam
2Btx—25 to 35 inches; silty clay loam
3Bt1—35 to 50 inches; very gravelly silty clay loam
4Bt2—50 to 80 inches; very cobbly clay

73097—Swiss gravelly silt loam, 15 to 35 percent slopes, stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Clayey residuum
Slope shape: Convex

Composition

Swiss and similar soils—85 percent
Minor components—15 percent
- Gatewood soils on the lower slopes and on southwest aspects
- Swiss soils, that have a surface layer of silt loam, on north aspects
- Areas that have slopes of more than 35 percent; along drains
- Soils that have boulders on the surface; on southwest aspects

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Dense material—40 to 80 inches
Flooding: None
Water table: 24 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 3 inches; gravelly silt loam
E—3 to 9 inches; gravelly silt loam
2Bt—9 to 40 inches; clay
2Cd—40 to 80 inches; clay loam

73098—Plato silt loam, 1 to 3 percent slopes

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Clayey loess over gravelly residuum derived from dolostone
Slope shape: Convex

Composition

Plato and similar soils—90 percent
Minor components—10 percent
- Mariosa soils in the less sloping areas
- Union soils in convex areas

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Depth to restrictive feature: Fragipan—20 to 36 inches
Flooding: None
Water table: 12 to 24 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 8 inches; silt loam

Bt—8 to 20 inches; silty clay
2Btx—20 to 48 inches; extremely gravelly silt loam
3Bt—48 to 60 inches; clay

73106—Mariosa silt loam, 0 to 2 percent slopes

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Clayey loess over fine-silty colluvium
Slope shape: Linear

Composition

Mariosa and similar soils—95 percent
Minor components—5 percent
- Mariosa soils that have a dark surface layer
- Plato soils around the perimeter of the mapped areas

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Depth to restrictive feature: Abrupt textural change—4 to 13 inches; dense material—20 to 40 inches
Flooding: None
Water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 7 inches; silt loam
E—7 to 11 inches; silt loam
Btg—11 to 38 inches; silty clay
2Btgx—38 to 80 inches; silt loam

73108—Gravois-Gatewood complex, 3 to 8 percent slopes

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Gravois—fine-silty loess over gravelly residuum derived from dolostone; Gatewood—clayey residuum derived from dolostone
Slope shape: Convex

Composition

Gravois and similar soils—50 percent
Gatewood and similar soils—40 percent
Minor components—10 percent
- Beemont soils on the lower slopes
- Moko soils on the less stable areas
- Useful soils in landform positions similar to those of the Gravois and Gatewood soils

Soil Properties and Qualities

Depth to bedrock: Gravois—very deep (more than 60 inches); Gatewood—moderately deep (20 to 40 inches)
Runoff: Gravois—high; Gatewood—very high
Percent of surface covered by rock fragments: Gravois—none; Gatewood—0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Gravois—dense material--18 to 40 inches; Gatewood—bedrock (lithic)--20 to 40 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Gravois

Ap—0 to 6 inches; silt loam
Bt—6 to 25 inches; silty clay loam
2Btx—25 to 35 inches; silty clay loam
3Bt1—35 to 50 inches; very gravelly silty clay loam
4Bt2—50 to 80 inches; very cobbly clay

Gatewood

A—0 to 2 inches; very gravelly silt loam
E—2 to 10 inches; very gravelly silt loam
2Bt—10 to 28 inches; clay
2R—28 to 60 inches; unweathered bedrock

73109—Alred gravelly silt loam, 15 to 35 percent slopes, stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Gravelly colluvium over clayey residuum derived from dolostone
Slope shape: Convex

Composition

Alred and similar soils—85 percent
Minor components—15 percent
- Gatewood soils on southwest aspects
- Gravois soils on the lower slopes
- Areas that have slopes of more than 35 percent; along drains

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Strongly contrasting textural stratification—15 to 39 inches
Flooding: None
Water table: None
Drainage class: Well drained

Typical Profile

A—0 to 7 inches; gravelly silt loam
E—7 to 15 inches; very gravelly loam
Bt1—15 to 21 inches; very gravelly loam
2Bt2—21 to 80 inches; gravelly clay, cobbly clay, and clay

73112—Gunlock silt loam, 3 to 8 percent slopes

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Clayey loess over gravelly residuum derived from dolostone
Slope shape: Concave

Composition

Gunlock and similar soils—90 percent
Minor components—10 percent
Cotton soils in the less sloping areas
Gunlock soils that have gravel on the surface; adjacent to residual soils
Soils that have bedrock at a depth of less than 60 inches; on the upper slopes

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Depth to restrictive feature: Dense material—20 to 34 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 5 inches; silt loam
Bt—5 to 25 inches; silty clay loam
2Btx—25 to 43 inches; silty clay loam
3Bt1—43 to 55 inches; extremely gravelly silty clay loam
3Bt2—55 to 80 inches; clay, gravelly silty clay, and silty clay

73135—Union silt loam, 3 to 8 percent slopes

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Clayey loess over residuum derived from dolostone
Slope shape: Convex

Composition

Union and similar soils—90 percent
Minor components—10 percent
Plato soils in the less sloping areas
Rueter and Swiss soils on narrow ridges
Useful soils in landform positions similar to those of the Union soil

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Depth to restrictive feature: Fragipan—18 to 36 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 30 inches; silty clay loam
2Btx—30 to 53 inches; extremely cobbly loam, extremely gravelly silt loam
3Bt—53 to 80 inches; clay

73136—Union silt loam, 1 to 3 percent slopes

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Clayey loess over residuum derived from dolostone
Slope shape: Convex

Composition

Union and similar soils—90 percent

Minor components—10 percent
Plato soils in depressional areas
Union soils that have slopes of 3 to 8 percent; on the lower slopes

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Depth to restrictive feature: Fragipan—18 to 36 inches
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 30 inches; silty clay loam
2Btx—30 to 53 inches; extremely gravelly silt loam, extremely cobbly loam
3Bt—53 to 80 inches; clay

73158—Cotton silt loam, 3 to 8 percent slopes, footslopes

Setting

Landform: Hillside
Position on landform: Footslope
Parent material: Loess over residuum derived from cherty dolostone
Slope shape: Concave

Composition

Cotton and similar soils—90 percent
Minor components—10 percent
Cotton soils that have a surface layer of gravelly silt loam; adjacent to residual soils
Gunlock soils in the convex, more sloping areas
Hartville soils in landform positions similar to those of the Cotton soil

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Depth to restrictive feature: Dense material—20 to 40 inches
Flooding: None
Water table: 6 to 18 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 7 inches; silt loam
Bt—7 to 11 inches; silt loam
Btg—11 to 26 inches; silty clay
2Btx—26 to 55 inches; silt loam
3Bt—55 to 80 inches; gravelly clay

73165—Knobby-Rock outcrop-Bardley complex, 35 to 75 percent slopes, extremely stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Knobby—loamy residuum derived from dolostone; Rock outcrop—no data; Bardley—gravelly colluvium over clayey residuum derived from dolostone
Slope shape: Knobby—linear; Rock outcrop—no data; Bardley—convex

Composition

Knobby and similar soils—45 percent
Rock outcrop—30 percent
Bardley and similar soils—20 percent
Minor components—5 percent
Alred soils on the upper and lower slopes
Areas that have slopes of more than 75 percent; adjacent to streams
Areas where the depth to bedrock is less than 4 inches

Soil Properties and Qualities

Depth to bedrock: Knobby—very shallow and shallow (4 to 20 inches); Rock outcrop—no data; Bardley—moderately deep (20 to 40 inches)
Runoff: Very high
Percent of surface covered by rock fragments: Knobby—3 to 15 (well rounded stones); Rock outcrop—no data; Bardley—3 to 15 (subrounded stones)
Depth to restrictive feature (bedrock (lithic): Knobby—4 to 20 inches; Rock outcrop—no data; Bardley—20 to 40 inches
Flooding: None
Water table: None
Drainage class: Knobby—somewhat excessively drained; Rock outcrop—no data; Bardley—well drained

Typical Profile

Knobby

A1—0 to 3 inches; very cobbly sandy loam
A2—3 to 7 inches; very gravelly sandy loam
R—7 to 60 inches; unweathered bedrock

Bardley

A—0 to 4 inches; very gravelly silt loam
E—4 to 8 inches; extremely gravelly silt loam
2Bt—8 to 27 inches; clay
2R—27 to 60 inches; unweathered bedrock

73168—Swiss gravelly silt loam, 3 to 15 percent slopes, stony

Setting

Landform: Hillside
Position on landform: Summit and shoulder
Parent material: Clayey residuum
Slope shape: Convex

Composition

Swiss and similar soils—85 percent
Minor components—15 percent
Union soils on narrow summits
Areas that have slopes of more than 15 percent

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Dense material—40 to 80 inches
Flooding: None
Water table: 24 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 3 inches; gravelly silt loam
E—3 to 9 inches; gravelly silt loam
2Bt—9 to 40 inches; clay
2Cd—40 to 80 inches; clay loam

73192—Beemont gravelly silt loam, 3 to 8 percent slopes, stony

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Gravelly colluvium over clayey residuum derived from dolostone
Slope shape: Convex

Composition

Beemont and similar soils—90 percent
Minor components—10 percent
Gravois soils on summits
Swiss soils in landform positions similar to those of the Beemont soil

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Bedrock (lithic)—40 to 60 inches
Flooding: None
Water table: 24 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 6 inches; gravelly silt loam
2Bt—6 to 53 inches; clay
2R—53 to 80 inches; unweathered bedrock

73193—Beemont very gravelly silt loam, 8 to 15 percent slopes, stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Gravelly colluvium over clayey residuum derived from dolostone
Slope shape: Convex

Composition

Beemont and similar soils—85 percent
Minor components—15 percent
Beemont soils that have slopes of 15 to 35 percent
Gatewood soils on southwest aspects
Gravois soils on northeast aspects

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Bedrock (lithic)—40 to 60 inches
Flooding: None
Water table: 24 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 6 inches; very gravelly silt loam
E—6 to 20 inches; very gravelly loam

2Bt—20 to 53 inches; clay
2R—53 to 80 inches; unweathered bedrock

73194—Beemont very gravelly silt loam, 15 to 35 percent slopes, stony

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Gravelly colluvium over clayey residuum derived from dolostone
Slope shape: Convex

Composition

Beemont and similar soils—90 percent
Minor components—10 percent
Gatewood soils on southwest aspects
Gravois soils on northeast aspects
Areas that have slopes of less than 15 percent

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff: Very high
Percent of surface covered by rock fragments: 0.01 to 0.10 (subrounded stones)
Depth to restrictive feature: Bedrock (lithic)—40 to 60 inches
Flooding: None
Water table: 24 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 6 inches; very gravelly silt loam
E—6 to 20 inches; very gravelly loam
2Bt—20 to 53 inches; clay
2R—53 to 80 inches; unweathered bedrock

73195—Useful-Moko complex, 3 to 8 percent slopes

Setting

Landform: Ridge
Position on landform: Summit
Parent material: Useful—loess over clayey residuum derived from dolostone; Moko—gravelly residuum derived from dolostone
Slope shape: Convex

Composition

Useful and similar soils—70 percent
Moko and similar soils—20 percent
Minor components—10 percent
Gatewood soils and Rock outcrop in landform positions similar to those of the Useful and Moko soils

Soil Properties and Qualities

Useful

Depth to bedrock: Useful—deep (40 to 60 inches); Moko—very shallow and shallow (4 to 20 inches)
Runoff: Useful—medium; Moko—very high
Percent of surface covered by rock fragments: Useful—none; Moko—0.01 to 0.10 (subrounded stones)
Depth to restrictive feature (bedrock (lithic): Useful—40 to 60 inches; Moko—4 to 20 inches
Flooding: None
Water table: Useful—24 to 42 inches; Moko—none
Drainage class: Useful—moderately well drained; Moko—well drained

Typical Profile

Useful

Ap—0 to 7 inches; silt loam
Bt1—7 to 31 inches; silty clay
2Bt2—31 to 45 inches; silty clay
2Bt3/2Cr—45 to 53 inches; silty clay loam
2R—53 to 60 inches; unweathered bedrock

Moko

A1—0 to 4 inches; gravelly clay loam
A2—4 to 7 inches; very channery clay loam
R—7 to 60 inches; unweathered bedrock

73196—Mariosa silt loam, 1 to 3 percent slopes, eroded

Setting

Landform: Hillside
Position on landform: Backslope
Parent material: Clayey loess over fine-silty colluvium
Slope shape: Linear

Composition

Mariosa and similar soils—90 percent
Minor components—10 percent
Plato soils on lower slopes

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Depth to restrictive feature: Abrupt textural change—4 to 13 inches; dense material—20 to 40 inches
Flooding: None

Water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 8 inches; silt loam
Btg—8 to 24 inches; silty clay
2Btgx—24 to 80 inches; silt loam

74633—Hartville silt loam, 1 to 3 percent slopes

Setting

Landform: Hillside
Position on landform: Footslope
Parent material: Clayey colluvium
Slope shape: Concave

Composition

Hartville and similar soils—85 percent
Minor components—15 percent
Cotton soils in the upper part of the map unit
Deible soils in the lower part of the map unit
Freeburg soils in landform positions similar to those of the Hartville soil

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Depth to restrictive feature: None
Flooding: None
Water table: 12 to 24 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 7 inches; silt loam
BE—7 to 12 inches; silt loam
Bt—12 to 48 inches; silty clay loam
2C—48 to 80 inches; silty clay loam

74634—Hartville silt loam, 3 to 8 percent slopes

Setting

Landform: Hillside
Position on landform: Footslope
Parent material: Clayey colluvium
Slope shape: Concave

Composition

Hartville and similar soils—90 percent
Minor components—10 percent
Deible soils in the less sloping areas

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Depth to restrictive feature: None
Flooding: None
Water table: 12 to 24 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 7 inches; silt loam
BE—7 to 12 inches; silt loam
Bt—12 to 48 inches; silty clay loam
2C—48 to 80 inches; silty clay loam

74656—Deible silt loam, 1 to 5 percent slopes, rarely flooded

Setting

Landform: Stream terrace
Position on landform: Tread
Parent material: Alluvium and colluvium
Slope shape: Concave

Composition

Deible and similar soils—85 percent
Minor components—15 percent
Cotton and Hartville soils on the upper slopes

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Depth to restrictive feature: Abrupt textural change—11 to 22 inches
Flooding: Rare
Water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 10 inches; silt loam
E—10 to 15 inches; silt loam
Btg1—15 to 37 inches; silty clay
2Btg2—37 to 80 inches; silty clay loam

75376—Cedargap gravelly silt loam, 0 to 3 percent slopes, frequently flooded

Setting

Landform: Flood plain
Parent material: Gravelly alluvium
Slope shape: Linear

Composition

Cedargap and similar soils—90 percent
Minor components—10 percent
Gladden soils in areas farther from the stream channels than the Cedargap soil
Secesh soils on low stream terraces

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Depth to restrictive feature: None
Flooding: Frequent
Water table: None
Drainage class: Well drained

Typical Profile

Ap—0 to 9 inches; gravelly silt loam
A—9 to 49 inches; very gravelly sandy clay loam, very gravelly loam
2C—49 to 60 inches; clay, very gravelly clay, very gravelly silty clay

75389—Hacreek silt loam, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Stream terrace
Position on landform: Tread
Parent material: Fine-silty alluvium
Slope shape: Linear

Composition

Hacreek and similar soils—90 percent
Minor components—10 percent
Hartville soils on the upper slopes adjacent to uplands
Racoon soils in landform positions similar to those of the Hacreek soil

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Depth to restrictive feature: None
Flooding: Rare
Water table: 12 to 24 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 21 inches; silty clay loam
Btg—21 to 81 inches; silty clay loam

75395—Jamesfin silt loam, 0 to 3 percent slopes, occasionally flooded

Setting

Landform: Stream terrace
Position on landform: Tread
Parent material: Fine-silty alluvium
Slope shape: Linear

Composition

Jamesfin and similar soils—90 percent
Minor components—10 percent
Jamesfin soils that are frequently flooded; in the slightly lower areas

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Depth to restrictive feature: None
Flooding: Occasional
Water table: 48 to 72 inches
Drainage class: Well drained

Typical Profile

Ap—0 to 10 inches; silt loam
Bw—10 to 60 inches; silt loam

75398—Kaintuck fine sandy loam, 0 to 3 percent slopes, frequently flooded

Setting

Landform: Flood plain
Parent material: Coarse-loamy alluvium
Slope shape: Linear

Composition

Kaintuck and similar soils—85 percent
Minor components—15 percent
Jamesfin soils in areas farther from the stream channels than the Kaintuck soil
Stream channels and gravel bars

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very low
Depth to restrictive feature: None
Flooding: Frequent
Water table: None
Drainage class: Well drained

Typical Profile

Ap—0 to 6 inches; fine sandy loam
C—6 to 80 inches; stratified fine sand to silt loam

75399—Jamesfin silt loam, 0 to 3 percent slopes, frequently flooded

Setting

Landform: Flood plain
Parent material: Fine-silty alluvium
Slope shape: Linear

Composition

Jamesfin and similar soils—90 percent
Minor components—10 percent
- Gladden soils at the upper reaches of the map unit
- Jamesfin soils that are occasionally flooded; in the slightly higher areas
- Kaintuck soils near stream channels

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Depth to restrictive feature: None
Flooding: Frequent
Water table: 48 to 72 inches
Drainage class: Well drained

Typical Profile

Ap—0 to 10 inches; silt loam
Bw—10 to 60 inches; silt loam

75400—Gladden silt loam, 0 to 3 percent slopes, frequently flooded

Setting

Landform: Flood plain
Parent material: Coarse-loamy alluvium
Slope shape: Linear

Composition

Gladden and similar soils—85 percent
Minor components—15 percent
- Cedargap soils near stream channels
- Gladden soils that are moderately well drained
- Gladden soils that are occasionally flooded; in the slightly higher elevations
- Jamesfin soils at the lower reaches of the map unit
- Secesh soils in the slightly higher stream terraces

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Depth to restrictive feature: None
Flooding: Frequent
Water table: None
Drainage class: Well drained

Typical Profile

Ap—0 to 6 inches; silt loam
Bw—6 to 38 inches; silt loam
2C—38 to 60 inches; stratified extremely gravelly sand

75408—Secesh silt loam, 0 to 3 percent slopes, rarely flooded

Setting

Landform: Stream terrace
Position on landform: Tread
Parent material: Loamy alluvium over gravelly alluvium
Slope shape: Linear

Composition

Secesh and similar soils—95 percent
Minor components—5 percent
- Hartville soils on footslopes at the slightly higher elevations

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Depth to restrictive feature: None
Flooding: Rare
Water table: None
Drainage class: Well drained

Typical Profile

Ap—0 to 6 inches; silt loam
Bt1—6 to 16 inches; silty clay loam
2Bt2—16 to 42 inches; loam
3Bt3—42 to 80 inches; very gravelly sandy clay loam

99000—Pits, quarries

Definition

This map unit consists of areas from which rock has been removed.

Composition

Pits, quarries—95 percent
Minor components—5 percent

Minor Components

Processed and/or stockpiled stone

99001—Water

Definition

Naturally occurring and manmade bodies of water

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
64000	Racoon silt loam, 0 to 3 percent slopes, rarely flooded	2,730	0.8
64001	Freeburg silt loam, 0 to 3 percent slopes, rarely flooded	1,973	0.6
66003	Jemerson silt loam, 0 to 2 percent slopes, rarely flooded	1,739	0.5
66005	Deible silt loam, 0 to 2 percent slopes, rarely flooded	26	*
70028	Moko-Rock outcrop complex, 3 to 15 percent slopes, very stony	5,511	1.6
70029	Moko-Rock outcrop complex, 15 to 50 percent slopes, very stony	6,632	2.0
73012	Gravois silt loam, 3 to 8 percent slopes	16,243	4.8
73035	Gravois silt loam, 8 to 15 percent slopes	13,695	4.0
73088	Rueter very gravelly silt loam, 8 to 15 percent slopes, very stony	16,624	4.9
73089	Rueter very gravelly silt loam, 15 to 35 percent slopes, very stony	34,305	10.1
73090	Useful silt loam, 3 to 8 percent slopes	4,780	1.4
73091	Useful silt loam, 8 to 15 percent slopes, eroded	7,083	2.1
73092	Gatewood very gravelly silt loam, 3 to 8 percent slopes, stony	4,541	1.3
73093	Gatewood very gravelly silt loam, 8 to 15 percent slopes, stony	21,532	6.4
73094	Gatewood very gravelly silt loam, 15 to 35 percent slopes, stony	44,565	13.1
73095	Gravois silt loam, 15 to 20 percent slopes	591	0.2
73097	Swiss gravelly silt loam, 15 to 35 percent slopes, stony	4,727	1.4
73098	Plato silt loam, 1 to 3 percent slopes	7,588	2.2
73106	Mariosa silt loam, 0 to 2 percent slopes	2,373	0.7
73108	Gravois-Gatewood complex, 3 to 8 percent slopes	1,198	0.4
73109	Alred gravelly silt loam, 15 to 35 percent slopes, stony	5,413	1.6
73112	Gunlock silt loam, 3 to 8 percent slopes	8,600	2.5
73135	Union silt loam, 3 to 8 percent slopes	45,469	13.4
73136	Union silt loam, 1 to 3 percent slopes	1,110	0.3
73158	Cotton silt loam, 3 to 8 percent slopes, footslopes	6,498	1.9
73165	Knobby-Rock outcrop-Bardley complex, 35 to 75 percent slopes, extremely stony	1,158	0.3
73168	Swiss gravelly silt loam, 3 to 15 percent slopes, stony	18,584	5.5
73192	Beemont gravelly silt loam, 3 to 8 percent slopes, stony	638	0.2
73193	Beemont very gravelly silt loam, 8 to 15 percent slopes, stony	6,380	1.9
73194	Beemont very gravelly silt loam, 15 to 35 percent slopes, stony	4,343	1.3
73195	Useful-Moko complex, 3 to 8 percent slopes	910	0.3
73196	Mariosa silt loam, 1 to 3 percent slopes, eroded	2,809	0.8
74633	Hartville silt loam, 1 to 3 percent slopes	3,038	0.9
74634	Hartville silt loam, 3 to 8 percent slopes	638	0.2
74656	Deible silt loam, 1 to 5 percent slopes, rarely flooded	453	0.1
75376	Cedargap gravelly silt loam, 0 to 3 percent slopes, frequently flooded	8,633	2.5
75389	Hacreek silt loam, 0 to 2 percent slopes, rarely flooded	389	0.1
75395	Jamesfin silt loam, 0 to 3 percent slopes, occasionally flooded	3,389	1.0
75398	Kaintuck fine sandy loam, 0 to 3 percent slopes, frequently flooded	3,013	0.9
75399	Jamesfin silt loam, 0 to 3 percent slopes, frequently flooded	6,148	1.8
75400	Gladden silt loam, 0 to 3 percent slopes, frequently flooded	10,689	3.2
75408	Secesh silt loam, 0 to 3 percent slopes, rarely flooded	759	0.2
99000	Pits, quarries	101	*
99001	Water	1,352	0.4
	Total	338,970	100.0

* Less than 0.1 percent.

Prime Farmland

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

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

About 48,226 acres in the survey area, or approximately 14 percent of the total acreage, meets the soil requirements for prime farmland. This land is mainly on the flood plains and broad upland ridges of general soil associations 1, 4, and 6. Most of the prime farmland is used for hay and pasture. Some of the prime farmland is used for cultivated crops. The main crops grown on this land are corn, soybeans, grain sorghum, and wheat. Approximately 33 percent of the county, about 110,300 acres, does not qualify as prime farmland, but is land of statewide agricultural importance.

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

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

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name below. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

The soils identified as prime farmland in Maries County are:

64000 Racoon silt loam, 0 to 3 percent slopes, rarely flooded (where drained)
64001 Freeburg silt loam, 0 to 3 percent slopes, rarely flooded
66003 Jemerson silt loam, 0 to 2 percent slopes, rarely flooded
66005 Deible silt loam, 0 to 2 percent slopes, rarely flooded (where drained)

73098 Plato silt loam, 1 to 3 percent slopes
73106 Mariosa silt loam, 0 to 2 percent slopes (where drained)
73136 Union silt loam, 1 to 3 percent slopes
73196 Mariosa silt loam, 1 to 3 percent slopes, eroded
74633 Hartville silt loam, 1 to 3 percent slopes
74656 Deible silt loam, 1 to 5 percent slopes, rarely flooded
75389 Hacreek silt loam, 0 to 2 percent slopes, rarely flooded
75395 Jamesfin silt loam, 0 to 3 percent slopes, occasionally flooded
75398 Kaintuck fine sandy loam, 0 to 3 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
75399 Jamesfin silt loam, 0 to 3 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
75400 Gladden silt loam, 0 to 3 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
75408 Secesh silt loam, 0 to 3 percent slopes, rarely flooded

Use and Management of the Soils

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

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

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

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

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

Interpretive Ratings

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

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited or not limited by all of the soil features that affect a specified use. Terms for the limitation classes are *not limited, slightly limited, moderately limited, limited,* and *very limited*. In certain tables, the soils are rated as *improbable, possible,* or *probable* sources of specific materials used for construction materials.

Numerical Ratings

Numerical ratings in the tables indicate the severity of individual limitations. They also indicate the overall degree to which a soil is limited or not limited for a specific use. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations 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.

In tables that use limitation class terms, such as *very limited* or *limited*, the limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each map unit component. The overall limitation rating for the component is based on the most severe limitation.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants

best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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

In 1992, approximately 148,100 acres in Maries County was used as pasture and 28,800 acres was used as hayland. About 141,800 acres was woodland, and an estimated 5,700 acres was cultivated cropland. Approximately 9,200 acres was used for towns, houses, farmsteads, ponds, rivers, and roads (USDA, 1992).

Field crops are not grown extensively in the county,

Figure 9.—Corn is grown on a limited acreage in Maries County, mainly on very deep alluvial soils, such as this area of Jamesfin silt loam, 0 to 3 percent slopes, occasionally flooded.

but they are a significant part of the agricultural production. In 1997, corn was harvested on about 2,000 acres (fig. 9). Soybeans, grain sorghum, and small grain crops were grown on the rest of the cultivated acreage (Missouri Department of Agriculture and USDA, 1998).

Most areas in which corn and soybeans are grown in the county are on the flood plains. Many areas of the more droughty soils, primarily in the uplands, are used for small grain or as pasture and hayland.

Cropland

The potential for increased crop production in Maries County is good. Production can be increased by applying the latest agricultural technology on all cropland in the county. This survey can facilitate the application of such technology. About 28,000 acres in the county occurs as level and very gently sloping soils that are not frequently flooded and that may be suitable for intensive cultivation. An additional 82,000 acres occurs as gently sloping and moderately sloping soils that are suitable for cultivated crops if erosion is controlled. Trees have been cleared from most of this acreage.

Cropland Erosion

Soil erosion is the major hazard on nearly all sloping cropland and overgrazed pastureland in Maries County. All soils that have slopes of more than 2 percent are susceptible to damage from erosion.

Soil erosion results in the gradual loss of the surface layer, which reduces productivity. Erosion is especially damaging in areas of soils that have a clayey subsoil, which becomes mixed with the plow layer. Good seedbed preparation and germination rates become increasingly difficult to achieve. Cotton, Gunlock, Hartville, Plato, Union, and Useful soils are erodible and have a clayey subsoil. Clayey areas resulting from erosion make tillage and seedbed preparation difficult. Erosion also reduces the productivity of soils that have a restricted rooting depth caused by a fragipan or bedrock. Bardley, Gatewood, Knobby, Moko, Plato, and Union soils are examples. Erosion in areas of these soils effectively reduces the volume of soil available to supply water and nutrients for plants. Erosion also removes valuable slow-release nutrients in the topsoil.

Soil erosion on farmland results in the sedimentation of streams, lakes, ponds, and road ditches. Controlling this erosion minimizes the pollution of streams by sediment and pesticides and thus improves the quality of water for municipal use, recreation, fish, and wildlife. Minimizing the sedimentation caused by erosion also prolongs the useful life of ponds, lakes, and roadside ditches.

Erosion-Control Practices

Erosion-control practices provide a protective surface cover, reduce the runoff rate, and increase the rate of water infiltration. A cropping system that keeps vegetative cover or crop residue on the surface can hold erosion losses to amounts that will not reduce the productive capacity of the soil. Growing grasses and legumes for pasture and hay is very effective in controlling erosion. Including grasses and legumes in the crop rotation also improves tilth and provides nitrogen for the following crop.

Significant reductions in soil loss can be accomplished by basic management techniques. Farming on the contour reduces soil loss by as much as 50 percent. Conservation tillage is a management practice in which the amount of tillage is minimized so that at least 30 percent of the soil surface is covered with residue after the crop is planted. The residue controls erosion by buffering the impact of raindrops, which can dislodge unprotected topsoil. Also, reducing the runoff rate minimizes the removal of soil particles from the field. The effectiveness of this system increases as larger amounts of residue are left on the surface. Conservation tillage is well suited to all of the upland soils that are commonly used for row crops. No-till farming is a practice that eliminates tillage operations entirely and leaves nearly all of the crop residue on the surface. For some farmers in the county, this practice has become a cornerstone of their conservation efforts. Other benefits of no-till farming include less expenditure for equipment, less soil compaction, time savings at planting time, conservation of soil moisture, and fuel savings.

The large amounts of residue left on the surface when no-till farming is practiced also shield the soil from sunshine and thus reduce the evaporation rate. This reduction is an asset in the summer during droughty periods, but it tends to delay warming and drying of the soil in the spring. For this reason, no-till farming is best suited to deep or very deep, moderately well drained or well drained soils that are not frequently flooded, such as Gravois, Gunlock, Jamesfin, Jemerson, and Useful soils.

Contour stripcropping reduces the hazard of erosion because it involves the maintenance of contoured strips of permanent vegetation. The strips of grasses or legumes are typically used as hayland. The areas between the strips are cultivated, and row crops are planted on the contour. The strips of grasses or legumes minimize erosion and help to filter the

sediment from runoff that would otherwise leave the field.

Terraces reduce the length of slopes and thus reduce the rate of runoff and the hazard of erosion. Broad-base terraces are most practical on uneroded upland soils that have uniform slopes of less than 8 percent. Construction of grassed backslope or narrow-base terraces reduces the steepness of the slope because construction cuts are made from the downslope side. Construction of broad-base terraces actually increases the slope and makes additional erosion-control practices crucial. In areas of soils that have a clayey subsoil, such as Hartville soils, topsoiling may be required if terracing exposes the subsoil. Cotton, Gravois, Gunlock, and Plato soils have similar intensive management needs because of a dense layer in the subsoil.

Vegetative buffer strips alongside drainageways and streams are effective in filtering sediment and pollutants from surface water before the flow becomes concentrated. These strips help to keep soil losses localized and thus reduce the damage associated with sedimentation. As a result, the quality of water is enhanced and protected.

Grade-stabilization structures are small bodies of water that cover up eroding areas and prevent further uphill encroachment. These structures provide a stable place into which tile terrace outlets or grassed waterways can empty runoff from terraced fields.

Soil Wetness

Wetness and/or flood control are management concerns on about 42,500 acres in the county. Deible, Freeburg, Hacreek, and Racoon soils and areas of Mariosa soils on ridgetops are naturally so wet that planting or harvesting is delayed or crop production is reduced in most years. Land grading or surface drainage may be needed to some extent in areas of these soils.

In the past, the drainage of wetland areas was unregulated and therefore occurred at the discretion of individual landowners. In recent years, however, legislation has been enacted in recognition of the importance of wetlands to the total environment. The intent of these laws is to protect existing wetlands from further degradation and to encourage redevelopment of areas that were formerly wetlands. Before any area that might be considered a wetland is altered, land users should make sure they are in compliance with existing laws. The Natural Resources Conservation Service can provide assistance in evaluating such compliance.

Flooding is a hazard in areas of Cedargap, Deible, Freeburg, Gladden, Hacreek, Jamesfin, Jemerson, Kaintuck, Racoon, and Secesh soils.

Soil Fertility

Soil fertility is naturally low in most of the eroded and shallow soils in the survey area. All of the soils, however, need additional plant nutrients for maximum production. Because most of the soils are naturally acidic in the upper part of the rooting zone, applications of lime are required to raise the pH and calcium level sufficiently for optimum growth of legumes. On all of the soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the production level desired. The Cooperative Extension Service can help in determining these values. This soil survey can be a useful tool for identifying the location of contrasting soils for sampling.

Soil Tilth

Soil tilth affects seedbed preparation, seed germination, and water infiltration. Soils that have good tilth are granular and porous. Regular additions of organic material help to maintain good tilth.

Most of the cultivated soils in the county have a surface layer of silt loam or loam that is low or moderate in content of organic matter. If these soils are frequently cultivated, soil structure becomes weak and intense rainfall can cause the formation of a crust on the surface. The crust hardens when it dries. As a result, the rate of water infiltration is reduced and the runoff rate is increased. Returning crop residue to the soil or regularly adding other organic material improves fertility, minimizes crusting, and increases the rate of water infiltration.

The bearing weight of machinery as it travels over the soil surface tends to compact the surface if the soil is moist or wet. This compaction reduces the infiltration of water into the soil and makes the resulting seedbed less favorable for root penetration. Using machinery only during periods of optimum soil moisture minimizes the effects of compaction. Periodic deep tillage can improve existing compacted areas.

In the past, fall tillage was common. This practice provided tilth for spring planting, but the cultivation of the more sloping soils in the uplands resulted in serious soil losses. Such losses can be catastrophic when intense spring rains follow partial thawing of the bare, frozen surface layer. Planting winter cover crops and maintaining a cover of crop residue on the surface can reduce the hazard of erosion and actually improve tilth.

Pasture and Hayland

A combination of different kinds of grasses and legumes is necessary to obtain maximum forage production for the climate in Maries County. Cool temperatures in the spring and fall are favorable for the production of cool-season grasses. The hot summer months are more favorable for the production of warm-season grasses. Both kinds of grasses are suitable for many of the soils in the survey area. Legumes are suitable for some of the soils in the county. A management system that includes cool-season grasses, warm-season grasses, and legumes takes advantage of the entire growing season for forage production.

Cool-Season Grasses

Tall fescue is the most commonly grown cool-season grass in Maries County (fig. 10). A limited acreage of orchardgrass, timothy, smooth bromegrass, reed canarygrass, and Kentucky bluegrass also is grown. All of these grasses are commonly grown on upland soils, except for reed canarygrass, which is planted primarily on the wetter sites in areas of bottomland. These cool-season grasses can provide top production only when properly managed. Rotational grazing systems help to keep forage crops at an optimum height for the highest production. Supplemental fertilization and timely weed control are also essential for top production.

Figure 10.—Fescue is the predominant grass on cleared areas in the county, such as this area of Union silt loam, 3 to 8 percent slopes.

Cool-season grasses grow vigorously when temperatures are cool (between 50 and 85 degrees F). These grasses generally start growing in late March and can be grazed by late April. Timothy and bromegrass will not produce tillers unless a seedhead is allowed to develop. Therefore, overgrazing or haying too early in the growing season can reduce the total production of these forage crops. Orchardgrass will regrow vigorously with or without development of a seedhead, so the timing of grazing or haying is less critical for that species than for timothy and bromegrass. Bluegrass is generally less productive than the other cool-season grasses but can better withstand overgrazing and poor management. Fescue can also withstand abuse and severe site conditions, but endophyte-infested stands are widespread and produce less-than-optimum weight gains, especially during the summer. The reestablishment of existing stands with endophyte-free seed is an option. Careful grazing management and interseeding of legumes can minimize the effects and reduce the spread of the infestation. Some stands of fescue are also not palatable to livestock. Reed canarygrass is moderately palatable and is highly productive in areas that would be too wet for other grasses or row crops.

Because of the higher temperatures and the longer periods of daylight, the production of cool-season grasses decreases significantly by mid-June. As fall brings cooler temperatures and shorter days, growth increases accordingly. Production continues until the first killing frost occurs, usually in late October. One exception to this growth pattern is tall fescue, which continues growth until sometime in December.

Warm-Season Grasses

Warm-season grasses that are commonly grown in Maries County include big bluestem, indiangrass, switchgrass, and little bluestem. Gamagrass is grown on some small acreages. This species requires a high or very high available water capacity. This soil survey can help in locating areas of suitable soils.

Warm-season grasses were native to small areas of the county before the arrival of the early pioneers (fig. 11). These grasses were adapted to the soils and climate of the county. Their suitability for the climate is vividly demonstrated during the hot summer months of June, July, and August. The production of these grasses reaches a peak when the temperature reaches 90 degrees F. Growth slows when temperatures fall below 70 degrees F. An important advantage for summer forage production is that warm-season grasses need only 40 percent as much water as cool-season grasses to produce the same amount of forage.

Strict management techniques are necessary for optimum production and longevity of warm-season grasses. Rotational grazing patterns are needed so that these grasses can be utilized when they are growing vigorously and to prevent overgrazing during periods when growth is dormant. Minimum grazing height guidelines and prescribed burn plans should be followed. Supplemental fertilizer needs for warm-season grasses are small compared to those for cool-season grasses. Generally, nitrogen is the only supplement necessary for top production.

Legumes

Legumes are included in many forage systems in Maries County. They improve the overall quality and quantity of forage. When included with grasses in a seeding mixture, legumes stimulate growth of the grasses because of nitrogen fixation by bacteria on the roots of the legumes.

Pure legume stands provide sources of high protein forage. Some legumes, such as alfalfa and ladino clover, can cause bloating if unrestricted grazing is allowed; therefore, most pure legume stands are used as hayland. Alfalfa is the legume most commonly used for hay production. Other legumes, such as red clover, birdsfoot trefoil, and ladino clover, are used in pasture mixes. Crownvetch is used to stabilize steep banks and critically eroding areas.

Use and management of legumes involve selecting soils that are compatible with the growth characteristics of the various plants. For healthy, productive stands of some legumes, such as alfalfa, well drained or moderately well drained, very deep soils that have a high or very high available water capacity are needed. Jamesfin and Jemerson soils have such characteristics. Some legumes, such as alsike clover, can tolerate wetter soils. This soil survey can help in selecting the soils that are most suitable for the most productive forage crops.

Legumes do not need supplemental nitrogen because of the natural fixation that occurs in the root system. When used for hay, legumes require adequate amounts of phosphorus, potassium, and limestone for optimum production on most soils.

Balanced Management

The production of cool-season grasses, warm-season grasses, and legumes peaks at different periods of the growing season. Management plans that include all three kinds of forage make optimum use of the entire season. A system that includes rotational grazing or haying of these different crops can increase production while protecting the topsoil with a permanent cover of vegetation. The expected yields of various forage crops are provided in table 5.

Figure 11.—Areas of Mariosa silt loam, 0 to 2 percent slopes, were originally warm-season grass prairies.

Certain management practices are needed on all soils in the survey area. Timely mowing or chemical weed control minimizes competition from undesirable plants and encourages uniform grazing. Overgrazing reduces production and increases weed growth. Grazing when the soil is too wet causes surface compaction, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

An important element of any efficient grazing system is easy access to clean water. Access can be achieved by constructing ponds with freezeproof livestock watering devices that are fed via buried pipe through the dam. Such arrangements provide abundant clean water throughout the year but allow fencing of the pond dam and pool area in order to protect the water supply. Streams can be used for watering if access is localized in order to protect the stream from pollution. Filter strips alongside the stream help to filter the water entering the stream and help to stabilize channel areas. They also provide habitat for wildlife.

Numerous small springs were historically viewed as bothersome seepy areas. With minimal development, these areas can be easily developed as water sources for livestock. Buried drainage pipes remove water from the wet areas and feed livestock watering tanks, which are often constructed from used heavy-equipment tires (fig. 12). Overflow from each facility can be used to feed other similar facilities farther downslope. This

Figure 12.—A recycled tire from earth-moving equipment is used in a spring development system that provides fresh water for livestock, reduces streambank erosion, and improves water quality by reducing time spent in streambeds by livestock.

method results in an extensive system that helps to evenly distribute the grazing of livestock.

Specialty Crops

Specialty crops are grown on a limited basis in Maries County. Some small areas are used for tree farms. These crops require special equipment, management, and propagation techniques. This soil survey can help in identifying areas that are suitable for these and other crops if specific soil-related requirements are known.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of 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 high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit.

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

Class 1 soils have slight limitations that restrict their use.

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

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

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

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

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

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

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

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

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

Pasture and Hayland Suitability Groups

The soils in Maries County are assigned to a pasture and hayland group according to their suitability for pasture management.

Many different pasture and hayland suitability groups are in the survey area. Over time, the combination of plants best suited to a particular soil and climate has or will become dominant. Plant communities are not static but vary slightly from year to year and from place to place.

The relationship between soils and vegetation was ascertained during this survey. Thus, pasture and hayland suitability groups generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of each plant species. Soil reaction, salt content, and a seasonal high water table also are important. The "Field Office Technical Guide," which is available at local offices of the Natural Resources Conservation Service, can provide specific information about pasture and hayland suitability groups.

Table 6 shows, for each soil, the assigned pasture and hayland suitability group. Specific concerns and recommendations for pasture and hayland management for each group are described in the following paragraphs.

Group WLB—Wet Loamy Bottom. A seasonal high water table and flooding are the main management concerns. Plants should be selected accordingly. A seedbed can be easily prepared. A drainage system can improve the growth of deep-rooted species. The hazard of flooding should be considered when a grazing system is designed.

Group WCB—Wet Clayey Bottom. Wetness and flooding are the main management concerns. The soils in this group are poorly suited to hay. The hazard of flooding should be considered when a grazing system is designed. Maintaining stands of desirable species is difficult in depressional areas. A drainage system can improve the growth of deep-rooted species.

Group WCU—Wet Clayey Upland. Wetness is the main management concern. Maintaining stands of desirable species is difficult in depressional areas. A drainage system can improve the growth of deep-rooted species.

Group WLO—Wet Loamy Overflow. Wetness and flooding are the main management concerns. A seedbed can be easily prepared. A drainage system can improve the growth of deep-rooted species. The hazard of flooding should be considered when a grazing system is designed.

Group LyO—Loamy Overflow. Flooding is the main management concern. The hazard of flooding should be considered when a grazing system is designed.

Group CyU—Clayey Upland. Pasture and hay crops are effective in controlling erosion. Erosion during seedbed preparation is the main concern. Timely tillage and a quickly established ground cover reduce the hazard of erosion. The forage species that are tolerant of wetness grow best. The production of deep-rooted legumes is limited because of wetness and a restricted rooting depth.

Group GrU—Gravelly Upland. The soils in this group generally are not suited to cultivated crops. Droughtiness and erosion are the main management concerns. Seedbeds should be prepared on the contour. Timely seedbed preparation helps to ensure rapid plant growth and a protective ground cover.

Group MDU—Moderately Deep Upland. Shallow-rooted species that are tolerant of droughtiness should be selected for planting. Erosion is a serious hazard in newly seeded areas. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group WtP—Wet Pan. The species that are tolerant of wetness grow best. A dense layer in the subsoil can restrict the rooting depth and result in insufficient soil moisture in dry years. Erosion during seedbed preparation is the main concern. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group LyP—Loamy Pan. A few small areas of this group are used for cultivated crops, and some areas are wooded. A dense layer in the subsoil can restrict the rooting depth and result in insufficient soil moisture in dry years. Erosion during seedbed preparation is a hazard. Seedbeds should be prepared on the contour. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group GrO—Gravelly Overflow. Most areas of this group have been cleared of trees and are used for pasture and hay. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during periods of flooding help to keep the pasture in good condition.

Group ShU—Shallow Upland. Most areas of this group are used for native pasture and are best suited to shallow-rooted species. In some areas tillage is nearly impossible. Broadcast seeding may be necessary. The slope and rock outcrop can hinder mowing in places.

Group GNS—Generally Not Suited. The soils in this group generally are not suited to pasture and hay. The suitability for forage species and the use of equipment are limited by the slope, a high content of rock fragments, or both.

Forest Productivity and Management

Douglas Wallace, staff forester, Natural Resources Conservation Service, helped prepare this section.

A forest is more than a group of trees. The trees, the soil, and associated plants and animals form a forest ecosystem with many valuable properties. Wood fiber, sustained water quality and quantity, wildlife

habitat, and recreational activities are useful products from a productive forest ecosystem (Powers, 1985).

In 1986, about 44 percent of Maries County, or 149,146 acres, was forested (Geissman and others, 1986). Oak-hickory and eastern redcedar communities cover forested uplands in the county. White oak, red oak, bitternut hickory, and black oak grow on the better sites. Post oak, blackjack oak, eastern redcedar, and hickories are dominant on the shallower and more droughty soils. Areas that are very shallow or shallow to bedrock and areas of rock outcrop are dominated by eastern redcedar, blackjack oak, and prairie grasses. These areas are commonly referred to as "glades" or "cedar breaks." Flood-plain sites commonly support black walnut, American elm, sycamore, bur oak, hackberry, green ash, and black willow. The variations in tree species and growth on both uplands and bottomlands are dependent on the interaction of site characteristics, soil properties, and past management activities.

Site characteristics that affect tree growth include aspect (the direction the slope is facing), the degree of slope, and topographic position. These site characteristics influence the amount of available sunlight, air drainage, soil temperature, soil moisture, and relative humidity. Typically, north and east aspects and the lower slope positions, which are cooler and have better moisture conditions, are more productive than the south and west aspects and the upper slope positions of the same or similar soil types. Beemont, Gatewood, and Swiss soils exhibit particularly strong productivity and species responses to aspect and slope position.

Soil properties are fundamentally important for woodland production and management considerations. A quarter or more of a tree's mass is located in the soil, which serves as a reservoir for moisture, provides an anchor for roots, and supplies essential plant nutrients. In Maries County, important soil properties include wetness, slope, clay content, and depth.

Soil wetness is the result of a high water table, flooding, or ponding. It causes seedling mortality, limits the use of equipment, and increases the windthrow hazard by restricting the rooting depth of some trees. Somewhat poorly drained and poorly drained soils that have a high water table include Cotton, Deible, Freeburg, Hacreek, Hartville, Mariosa, Plato, and Racoon soils. Ruts form easily if wheeled skidders are used when these soils are wet. Deep ruts tend to restrict lateral drainage, result in damage to tree roots, and alter soil structure. Flooding and/or surface wetness can be a problem on about 42,500 acres. The soils on this acreage include Cedargap, Deible, Freeburg, Gladden, Hacreek, Jamesfin, Jemerson, Kaintuck, Mariosa, Racoon, and Secesh soils. On all of these soils, equipment should be used only during dry periods or when the ground is frozen.

The slope can limit the use of forestry equipment. A slope of 15 percent or more limits the use of equipment in logging areas, on skid roads, in yarding areas, and on logging roads. Soil erosion is a hazard in these disturbed areas. The soils on about 102,000 acres in the survey area have equipment limitations as a result of the slope and are highly susceptible to erosion. This acreage includes many areas of Alred, Bardley, Beemont, Gatewood, Gravois, Knobby, Moko, Rueter, and Swiss soils. Special erosion-control measures, such as water bars or dips, can reduce the hazard of erosion. Also, the design of logging roads and trails should minimize the steepness and length of slopes and the concentration of water. Moderately steep to very steep slopes indicate a safety hazard and limit the use of equipment. In these areas, equipment should be operated on the contour when possible. In some areas, it may be necessary to move the logs uphill to skid trails and yarding areas.

The content of clay in the topsoil or subsoil can affect equipment use and seedling mortality. Traction is reduced in areas of clayey soils. The seedling mortality rate is moderate or high in these areas, and the soils can easily become compacted when they are wet. Ruts form easily on unsurfaced roads and skid trails, which may be impassable during rainy periods. Soils that have a high content of clay in the subsoil include Bardley, Beemont, Cotton, Deible, Gatewood, Hartville, Mariosa, Plato, Swiss, and Useful soils. In areas of these soils, activities should be restricted to dry periods or to surfaced areas. Seedling establishment can be increased with mechanical or chemical weed control, mulching, or supplemental water.

Soil depth favorable to rooting is one of the most significant soil properties affecting woodland productivity. Soil horizons that are favorable for root development allow a tree to anchor its roots and provide volume for available water and nutrients. The very shallow and shallow Knobby and Moko soils have a limited rooting depth and rooting volume. Trees in areas of these soils are prone to water stress during dry years or dry seasons and are susceptible to windthrow during periods of high winds. The effective rooting depth is restricted to varying degrees on some soils in the survey area because of a high clay content in the subsoil. These soils include Alred, Bardley, Beemont, Cotton, Deible, Gatewood, Hartville, Mariosa, Plato, and Swiss soils. Other soils have root restrictions caused by subsoil layers that are too dense for root penetration. Plato and Union soils have such layers. In areas of soils that are very shallow or shallow over

bedrock and that have rock outcrops, such as Knobby and Moko soils, the use of equipment and the construction of logging roads are restricted. Carefully planning the location of proposed logging roads could minimize the effects of most of these limitations.

Management activities can influence woodland productivity and should be aimed at eliminating factors causing tree stress. Generally, proper management involves controlling erosion, thinning overstocked young stands, planting trees where natural regeneration is insufficient or undesirable, harvesting mature trees, and eliminating destructive fire and grazing.

Management activities should concentrate on sites with productive soils and on areas that support high-value timber species. The more productive soils in Maries County include Gravois, Gunlock, Hartville, and Useful soils in the uplands and Deible, Freeburg, Gladden, Hacreek, Jamesfin, Jemerson, Kaintuck, Racoon, and Secesh soils on bottomlands. High-value timber species include white oak, red oak, black walnut, and black oak.

Fire and grazing have very negative impacts on forest growth and quality. More than 30 percent of the woodland is still subject to moderate to heavy grazing. Grazing destroys the leaf layer on the surface, compacts the soil, and eliminates or damages tree seedlings. Fire damage to forests is a major concern throughout the Ozarks. Not only are trees damaged by fire, resulting in reduced wood quality and growth, but damage is also caused to soil, water quality, and wildlife habitat (Brandle and others, 1988). Woodland sites that are ungrazed and unburned have the highest potential for optimum timber, wildlife, and recreational production.

The tables in this section can help forest owners or managers plan the use of soils for wood crops. Potential productivity of the soils for wood crops is provided in table 7. Interpretive ratings are provided for various aspects of forest management in tables 8a and 8b.

Forest Productivity

In table 7, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," 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 trees. 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.

Forest Management

In tables 8a and 8b, interpretive ratings are given for various aspects of forest management. 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 the specified aspect of forest management. *Not limited* indicates that the soil has features that are very favorable for the specified aspect of management. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified aspect of management. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified aspect of management. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified aspect of management. The limitations can be overcome, but overcoming them generally requires special design, special planning, soil reclamation, specialized equipment, or other procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified aspect of management. The limitations generally cannot be overcome without major soil reclamation, special design, specialized equipment, or other expensive procedures. Poor performance, unsafe conditions, or high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited 0.00
Slightly limited ..... 0.01 to 0.30
Moderately limited ..... 0.31 to 0.60
Limited ..... 0.61 to 0.99
Very limited 1.00

The numerical ratings used to express the severity of individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation class for the component is based on the most severe limitation.

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management factors. 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 through the Agency's Website.

Ratings in the column *hand 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. Ratings indicate the expected difficulty of hand planting, which includes the proper placement of root systems of tree seedlings to a depth of up to 12 inches, using standard hand planting tools. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *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. Ratings indicate the expected difficulty in using a mechanical planter, which includes proper placement of root systems of tree seedlings to a depth of up to 12 inches. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *harvest equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, depth to a water table, and ponding. Ratings indicate the suitability for operating harvest equipment for off-road transport or harvest of logs and/or wood products by ground-based wheeled or tracked equipment.

Ratings in the column *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 part of the soil from the surface to a depth of about 12 inches is considered in the ratings. Ratings indicate the suitability of using surface-altering soil tillage equipment to prepare the site for planting or seeding.

Ratings in the column *roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, 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 on which trucks transport logs and other wood products from the site.

In table 8b, ratings in the column *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.

Ratings in the column *off-road or off-trail erosion* are based on slope and on the 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.

Ratings in the column *soil rutting* are based on depth to a water table, rock fragments on or below the surface, surface texture, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forest equipment. Ratings indicate limitations affecting the hazard or risk of ruts in the uppermost layers of the soil. Soil displacement and puddling (soil deformation and compaction) may occur simultaneously with the formation of ruts.

Ratings in the column *log landings* are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, depth to a water table, ponding, flooding, and the hazard of soil slippage. Ratings indicate the suitability of the soil at the forest site to serve as a log landing and to allow the efficient and effective use of equipment for the temporary storage and handling of logs.

Ratings in the column *seedling survival* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. Ratings indicate the impact of soil, physiographic, and climatic conditions on the survivability of newly established tree seedlings.

Windbreaks and Environmental Plantings

Douglas C. Wallace, staff forester, Natural Resources Conservation Service, helped prepare this section.

Living plants play an important role in supporting our life and improving its condition. When properly used and maintained, plants provide positive solutions to

many problems in our contemporary environment. In Maries County, windbreaks and environmental plantings can be utilized throughout the landscape to meet a variety of engineering, climatological, and esthetic needs.

Windbreaks can be grown successfully in most areas of Maries County. Several specific aspects of management should be considered when farmstead and feedlot windbreaks are planned. These include design and layout, species selection, site preparation, seedling handling, weed management, irrigation, and protection from diseases, insects, and livestock.

Farmstead windbreaks make the farmstead area a more comfortable place, reduce energy costs, increase garden and fruit tree yields, enhance wildlife populations, buffer noises, and raise property values (Scholten, 1988).

Feedlot windbreaks can be used to protect livestock from wind and snow. These windbreaks significantly reduce calf losses, make feeding operations easier, ameliorate livestock odors, and enable livestock to maintain optimum weight with less feed.

Farmstead and feedlot windbreaks are generally three or more rows wide and dense, and at least two of the rows consist of a coniferous species. The windbreaks should be established on the windward side of the area to be protected and as perpendicular as possible to the prevailing winds (Brandle and others, 1988). Well designed farmstead and feedlot windbreaks are needed throughout Maries County, especially in cleared areas of the Union-Swiss, Gatewood-Gravois, and Mariosa associations, which are described under the heading "General Soil Map Units."

Environmental plantings can be used for beautification, as visual screens, and for control of acoustical, pollution, and climatological problems around buildings and other living spaces. Care should be given to selecting plants that exhibit proper height, shape, form, color, and texture and that are compatible with the surrounding area, structures, and desired use (Robinette, 1972). Establishing trees and shrubs is relatively easy in most areas of Maries County, but adequate site preparation prior to planting and control of competition from weeds after planting are necessary.

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

Recreation

Shannon Zezula, area wildlife services biologist, Missouri Department of Conservation, helped prepare this section.

The rich diversity of plant and animal communities in Maries County provides numerous recreational opportunities. The Maries and Gasconade Rivers offer a multitude of recreational activities, including fishing, boating, floating, and wading (fig. 13). As of 1997, the Missouri Department of Conservation had developed two river accesses for boats on the Gasconade River. Bell Chute Access is southwest of Vienna and offers primitive camping. Paydown Access is northwest of Vienna and offers a picnic area and disabled access. Largemouth bass, rock bass, smallmouth bass, spotted bass, sunfish, crappie, and catfish are common at both of these accesses.

The Missouri Department of Conservation also manages several large properties in Maries County that offer various recreational opportunities (Missouri Department of Conservation, 1997). Rinquelin Trail Community Lake is a 285-acre area 12 miles southwest of Vienna that is accessible to the disabled. The area contains about 29 acres of fishable water and has a boat ramp, a fishing dock, and canoe access. Largemouth bass, spotted bass, bluegill, and catfish are common on this property. Rinquelin Trail also offers hunting for waterfowl and for upland and woodland wildlife. Deer, turkey, squirrels, rabbits, quail, and waterfowl are common.

Clifty Creek Conservation Area is a 265-acre forest that offers primitive camping and hunting. This area is in south-central Maries County. Adjacent to this property is the Clifty Creek Natural Area, which encompasses 230 acres. This area features high bluffs and a natural bridge over a stream. Hunting is allowed, but camping is not. Deer, turkey, squirrels, and rabbits are common in areas of both of these properties.

Freeburg Towersite is a 12-acre site 6 miles north of Vienna. It offers primitive camping and hunting. Deer, turkey, squirrels, and rabbits are common.

The largest managed area in Maries County is the Spring Creek Gap Conservation Area, which is 12 miles southwest of Vienna. The 1,819-acre area also contains the 40-acre Spring Gap Natural Area. Primitive camping is available in this area, along with hunting and dog training. Deer, turkey, squirrels, and rabbits are common.

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for

Figure 13.—The scenic Gasconade River offers opportunities for outdoor activities, such as fishing, camping, and canoeing.

recreational use. Soils are rated for camp areas, picnic areas, playgrounds, and paths and trails.

The ratings in the table 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 ratings in the table 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 recreational site development. *Not limited*

indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *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. *Moderately 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. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high 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 numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

The information in table 10 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 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, a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

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

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

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, a water table, ponding, flooding, slope, and texture of the surface layer. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to frequent flooding during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

Reggie Bennett and Shannon Zezula, area wildlife services biologists, Missouri Department of Conservation, helped prepare this section.

Maries County is on the northern border of the Ozark natural division of Missouri (Thom and Wilson, 1983; Yatskievych, 1999). Prior to European settlement, the primary vegetation in the area was oak-hickory forest, glades, savannas, treeless prairie, and both wooded and herbaceous wetlands. In 1992, about 52 percent of Maries County supported a grassland cover type. About 42 percent was woodland, and about 3 percent was cropland (USDA, 1992). These vegetative cover types influence the wildlife populations in the county.

Approximately 246 fish and wildlife species are known to occur in Maries County. These include 75 species of fish, 12 species of amphibians, 26 species of reptiles, 111 species of birds, and 22 species of mammals. Typical nongame species include the northern cardinal, the common grackle, and the pileated woodpecker. Common game species include eastern wild turkey, white-tailed deer, blue-winged teal, flathead catfish, common snapping turtle, and raccoon, all of which can be harvested according to the Missouri Wildlife Code.

Furbearers are common in Maries County. Historically, the number of raccoons harvested in the state has been high. Bobcats, which prefer heavily forested areas, also inhabit the county, and their population appears to be expanding. Other common furbearers include muskrat, opossum, coyote, beaver, river otter, and mink.

The federally endangered bald eagle and gray bat have been observed in the county. Species on Missouri's rare and endangered list that are known to occur in Maries County include northern harrier, Cooper's hawk, lake sturgeon, Niangua darter, and mooneye. Other rare and endangered species that are likely to inhabit the county include pallid sturgeon, American bittern, snowy egret, and Bachman's sparrow.

Soil types and soil productivity generally dictate land use and therefore influence the value of vegetation and cover for wildlife. The diversity and abundance of wildlife in Maries County are further dependent on the type and diversity of vegetation and on how the different types of vegetative cover are interspersed. Most of the grassland and woodland habitats in Maries County occur as a mosaic.

The place where two habitat types meet is called "edge." Developing edge habitat for wildlife is an important management opportunity in all areas of the county. Creating a better transition between different cover types benefits most wildlife more than a clear, defined break. For example, in a progression from a timbered area to grassland, good habitat would consist of tall trees in the timber, a transition to thick shrubby growth at the border, and finally a "feathering" out into the grassland, as opposed to tall trees and adjacent grassland habitat with no transitional area. The thick shrubby edge area provides the habitat elements that most wildlife use and benefit from.

Wildlife managers try to create an edge with different vegetative heights and types. The goal is to create a transition zone that is rich in plant diversity. The habitat quality of most of the edge in Maries County is poor, mainly because the vegetation is currently a single species of grass (in most cases, fescue) or because the edge is an abrupt change between areas of different types of vegetation, without a transition zone.

Timbered areas of Maries County offer excellent opportunities for wildlife habitat management. Examples of woodland wildlife include white-tailed deer, eastern wild turkey, squirrels, barred owl, marbled salamander, northern cardinal, blue jay, and broad-winged hawk. The ruffed grouse is also known to occur in Maries County and benefits from timber harvest activities, if they are conducted with this species in mind.

More than 50 percent of the vegetative cover in the Gatewood-Gravois, Rueter-Union, and Beemont-Gravois associations is woodland cover. Grass is the second most prevalent cover type in areas of these associations. The associations are described under the heading "General Soil Map Units." The Gravois soils in these associations support the best overall oak-hickory forests in the county.

Timber management is an important tool for enhancing wildlife habitat. Consultation with a professional forester is recommended. Deible, Freeburg, Gladden, Gravois, Gunlock, Hacreek, Hartville, Jamesfin, Jemerson, Kaintuck, Racoon, Secesh, and Useful soils are highly productive for timber and are generally the best sites on which to begin timber management in existing areas of woodland (fig. 14). Many of these sites have been cleared, however, and are presently used for other purposes. If tree planting is planned, these soils offer some of the best return on the dollar for wood fiber production. When grassland and cropland are abandoned in areas of these associations, woody species begin to invade and the total acreage of woodland increases. The most prevalent woody invader species are eastern redcedar, sassafras, persimmon, and post oak. Proper

Figure 14.—Valuable timber species, such as black walnut, are profitable when planted and well managed on productive sites such as this area of Gravois silt loam, 3 to 8 percent slopes.

management of these invaders will enhance both wildlife habitat and future timber value, depending on the management objectives.

Alred, Bardley, Beemont, Gatewood, Kaintuck, Rueter, and Swiss soils, which are still predominantly wooded, are examples of soils on which good timber production can be expected. For proper management of woodland, a diverse mix of species is preferred. Among the oaks, a good mixture of red oak and white oak is important to wildlife because the acorns of these species mature at different times. Red oak acorns take two years to mature, whereas white oaks grow acorns and drop them in the same year. When white oak acorns are not available, the red oak acorn crop from the preceding year is available for wildlife. This cycle helps to ensure a consistent acorn crop. On alluvial soils along small and medium-sized river bottoms, walnut species offer good management potential for timber and wildlife habitat. Key woodland wildlife management priorities include minimizing grazing in

areas of woodland, maximizing the diversity of tree species, preserving old second-growth tree communities, and developing edge habitat.

Maries County also has 28 documented caves that provide temporary and permanent habitat for a variety of wildlife species, most notably bats (Missouri Department of Natural Resources, 1986). Of the many species of bats found in Maries County, the Indiana bat and gray bat are potential inhabitants that are currently on the Federal list of threatened and endangered species. An important management activity for caves includes limiting access during critical periods, such as winter hibernation. This activity may require the proper installation of cave gates. Maintaining a forested buffer around the caves and taking care not to disturb any vegetation at the cave's entrance are also important. The vegetation in the cave's vicinity can affect the temperature, which is a critical consideration during hibernation (Missouri Department of Conservation, 1995).

Prior to European settlement, much of Maries County was a grass-brush-timber mixture referred to as savannas (Beilmann and Brenner, 1951). The soils that may be managed or restored as savannas include Bardley, Beemont, Gatewood, and Swiss soils (particularly on south- and west-facing slopes) and the somewhat drier Knobby and Moko soils, which occur in the Union-Swiss, Gatewood-Gravois, and Beemont-Gravois associations. Savanna management should include prescribed burning, limited livestock access, and removal of overstocked woody species.

Sites dominated by Knobby and Moko soils typically have numerous rock outcroppings and are referred to as dolostone glades. Small areas of these glades currently support xeric prairie-like flora that is not characteristic of other habitats in the county. Glades in the Meta area provide habitat for small populations of the collared lizard, which is on the state list of endangered species. Other wildlife species that inhabit restored glades and savannas are similar to those in areas of edge habitat. Management practices that help to restore the grassland component on specific sites of Knobby and Moko soils generally include the use of prescribed fire and a reduction in the amount of tree cover. Key management considerations are similar to those for savannas. They include prescribed burning, limited livestock access, and removal of invasive woody cover.

Grassland cover makes up the most prevalent habitat type in the county. The soils of the Mariosa series, which are predominant in areas of the Mariosa association, originally supported mostly treeless prairie cover. These prairies occurred on broad upland summits. The Cedargap and Hacreek soils in areas of the Jamesfin-Kaintuck-Racoon association also originally supported prairie vegetation, but the prairies in areas of these soils were on the flood plains along the streams and rivers. Significant areas of native prairie in Maries County have been described as originally occurring east of Belle and west of High Gate in areas of Mariosa soils (Schroeder, 1982).

A very important consideration affecting habitat for openland wildlife is the type of grass in which pastures and hayfields are established. Because of its vigor under almost any grazing situation, fescue is the most common forage species in the county. Unfortunately, fescue generally provides poor wildlife habitat. Intensive management of grazing systems is needed if habitat improvement is an objective in these areas. Such management includes introducing legumes, using different species of grass, implementing rotation grazing systems, and/or applying prescribed burning practices.

Where remnants of native warm-season grasses and native forbs exist, restoration of these natural communities is preferable to reintroduction. Restoration benefits wildlife as much as, if not more than, reintroduction and is generally easier to accomplish and less expensive. Restoration may include the use of prescribed fire, removal of invasive trees, edge development and management, and implementation of rotation grazing systems.

The Jamesfin-Kaintuck-Racoon association, which is on the flood plains along the Gasconade River, provides additional habitat for openland wildlife. This association is heavily cropped. Many soil conservation measures can enhance the habitat in areas of cropland. These measures include leaving some crop standing for "food plots" and using a system of conservation tillage. Edge development in areas where cropland meets woodland and grassland can also provide habitat for a variety of wildlife.

The Jamesfin-Kaintuck-Racoon association also includes areas of riparian habitat, or wooded areas along the streambanks. Riparian areas offer timber management opportunities and provide critical habitat for belted kingfishers, great horned owls, yellow warbler, wood ducks, and many other terrestrial wildlife species. Riparian areas are also crucial as a contributing habitat for the fishery resource. Bald eagles and osprey frequent these areas because of their proximity to the large rivers. Heart-leafed plantain is a rare plant that may be found in riparian areas along rocky, shaded intermittent streams in the county.

The Jamesfin-Kaintuck-Racoon association contains most of the remaining wetlands in Maries County, but small wetlands also are in areas of bottomland in other associations. Wetlands and marshes are an important

cover type for many species of wildlife, including bullfrogs, red-winged blackbird, green-winged teal, blue-winged teal, beaver, deer, and mink. These wetlands are in old oxbows and river channels on bottomland. Areas of Hacreek soils are likely to be suitable for the occurrence or development of marshy, herbaceous wetlands. Areas of Deible and Racoon soils were originally wooded and offer the potential for bottomland hardwood habitats.

The Gasconade geologic formation, mainly in areas of the Jamesfin-Kaintuck-Racoon association along the Gasconade River, gives rise to seeps and springs that provide "micro-environments" for a variety of wildlife. Species that commonly inhabit these areas include mink, muskrat, northern slimy salamander, green frog, green sunfish, fathead minnows, and various songbirds, such as blue-winged warblers, Kentucky warblers, common yellowthroats, and red-winged blackbirds. Important management considerations for these microhabitats include limiting livestock access and maintaining the existing native cover.

Maries County has an unusual diversity of flowing waters, including the Gasconade and Maries Rivers and many smaller streams. This wide diversity of hundreds of miles of permanent flowing streams provides habitat for approximately 75 species of fish and 31 species of freshwater mussels that are known to, or are likely to, occur in such waters (Oesch, 1995). Some fish species, such as the Niangua darter, are federally listed as threatened in the Maries River and are very uncommon. Other species, such as channel catfish, carp, drum, smallmouth bass, largemouth bass, rock bass, and other sunfish, are quite common and provide sport for anglers. Gigging of nongame fish, floating, power boating, and wading also are important water-related recreational activities on these rivers and streams. Important management considerations for stream habitat include following proper gravel removal techniques, maintaining and enhancing riparian corridors, and minimizing streambank erosion and sedimentation by restricting livestock access.

In addition to flowing waters, Maries County has approximately 26 small lakes and hundreds of ponds, most of which are stocked with largemouth bass, channel catfish, and bluegill (Missouri Department of Natural Resources, 1986). The Union-Swiss association includes a unique manmade habitat type in areas where numerous clay pits have been excavated. These pits provide a rare opportunity for management practices that benefit many amphibians, which require fishless ponds in forested areas in order to breed. Such species as spotted salamander, marbled salamander, central newt (a type of salamander), northern spring peepers, and bullfrogs occur in these areas. Generally, the high amphibian population in these clay pits can also serve to reduce the mosquito population.

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

In tables 11a and 11b, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The 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 the specified use. *Not limited* indicates that the soil has features that are very favorable for the specified use. Habitat is easily established, improved, or maintained. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Habitat can be established, improved, or maintained. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. Habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. Habitat is difficult to create, improve, or maintain in most places. Management is difficult and must be very intensive. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. Habitat is usually impractical or impossible to create, improve, or maintain. Management would be very difficult, and unsatisfactory results can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation class for the component is based on the most severe limitation.

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Selection should be made from a list of locally adapted species.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Selection should be made from a list of locally adapted species.

Upland wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Selection should be made from a list of locally adapted species.

Upland shrubs and vines are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs and vines are depth of the root zone, available water capacity, salinity, and soil moisture. Selection should be made from a list of locally adapted species.

Upland deciduous trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees are depth of the root zone, available water capacity, and wetness. Selection should be made from a list of locally adapted species.

Upland mixed deciduous-conifer trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, browse, seeds and foliage. Soil properties and features that affect the growth of these trees are depth of the root zone, available water capacity, and wetness. Selection should be made from a list of locally adapted species.

Riparian herbaceous plants are annual and perennial native or naturally established grasses and forbs that grow on moist or wet sites. Soil properties and features affecting riparian herbaceous plants are surface texture, wetness, flooding, ponding, and surface stones. Selection should be made from a list of locally adapted species.

Riparian shrubs, vines, and trees are bushy woody plants and trees that grow on moist or wet sites. Soil properties and features affecting these plants are surface texture, wetness, flooding, ponding, and surface stones. Selection should be made from a list of locally adapted species.

Freshwater wetland plants are grasses, forbs, and shrubs that are adapted to wet soil conditions. The soils suitable for this habitat generally occur adjacent to springs, seeps, depressions, bottomlands, marshes, or backwater areas of flood plains. Most areas are ponded for some period of time during the year. Soil properties and features affecting these plants are surface texture, wetness, ponding, and soil reaction. Selection should be made from a list of locally adapted species.

Irrigated freshwater wetland plants are grasses, forbs, and shrubs that are adapted to wet soil conditions. The soils suitable for this habitat generally occur in areas of cropland, previously cropped areas, and marginal areas associated with cropland and wetlands. These areas may be ponded for some period of time during the year. These areas are generally suitable for restoring wetland features temporarily or permanently. Soil properties and features affecting these plants are surface texture, permeability, wetness, ponding, and soil reaction. Selection should be made from a list of locally adapted species.

Engineering

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

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet.

Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

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

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

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

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

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 12 shows the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *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. *Moderately 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. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high 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 numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

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 a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

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

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

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; a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for sanitary facilities. Soils are rated for septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill.

The ratings in the table 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 sanitary facilities. *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. *Moderately 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. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high 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 numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

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

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may be contaminated. Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, hillside seepage, and contamination of ground water, can affect public health.

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, a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

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

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

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

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

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the

soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

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

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

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

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

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

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

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

Construction Materials and Excavating

The soils of the survey area are rated in table 14 as a source of roadfill, sand, gravel, or topsoil. Normal compaction, minor processing, and other standard construction practices are assumed. The soils are also rated according to limitations that affect their suitability for shallow excavations. The ratings in the table are both verbal and numerical.

Rating class terms, as follows, are used to indicate the extent to which the soils are limited by soil features that affect their use as a source for roadfill, sand, gravel, or topsoil or their suitability for shallow excavations. *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. *Moderately 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. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high 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 numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of

individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

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

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

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, 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).

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, 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 the thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

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, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

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

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

Water Management

The soils of the survey area are rated in table 15 according to limitations that affect their suitability for water management. Soils are rated for pond reservoir areas, drainage, irrigation, terraces and diversions, and grassed waterways. Restrictive features that affect each soil for the specified use are also listed in the table.

The ratings in the table 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 specified use. *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. *Moderately 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. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires

special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high 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 numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

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. Slope can affect the storage capacity of the reservoir area.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, permeability, depth to a water table, ponding, slope, and flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or a cemented pan, large stones, slope, and the likelihood that cutbanks will cave. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. The availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to a water table, ponding, flooding, available water capacity, intake rate, permeability, erodibility, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone, reaction, and the amount of salts, sodium, sulfur, lime, or gypsum.

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, a water table, slope, and depth to bedrock affect the construction of grassed waterways. Erodibility, soil moisture regime, available water capacity, restricted rooting depth, restricted permeability, and toxic substances, such as salts and sodium, affect the growth and maintenance of the grass after construction.

Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Table 16 shows the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 mg/l. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater

generally ranges from 50 to 2,000 mg/l. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the table are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater through irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (slow rate treatment of wastewater and rapid infiltration of wastewater).

The ratings in the table 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 specified use. *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. *Moderately 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. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high 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 numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations 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.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

Land application of manure and food-processing waste not only disposes of waste material but also improves crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Land application of municipal sewage sludge not only disposes of waste material but also improves crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is

considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also improves crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water percolates to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, a water table, ponding, available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil, eventually reaching the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. A water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Corn	Grain sorghum	Orchardgrass-red clover*	Soybeans	Tall fescue	Warm-season grasses**	Winter wheat
		Bu	Bu	Tons***	Bu	Tons***	Tons***	Bu
64000:								
Racoon	2w	91.00	81.00	5.80	34.00	5.30	7.40	37.00
64001:								
Freeburg	2w	118.00	105.00	6.40	46.00	5.00	6.60	50.00
66003:								
Jemerson	1	125.00	115.00	6.60	42.00	5.00	6.40	46.00
66005:								
Deible	4w	91.00	81.00	5.80	34.00	5.30	7.30	37.00
70028:								
Moko	6s	---	---	---	---	1.00	1.40	---
Rock outcrop	8s	---	---	---	---	---	---	---
70029:								
Moko	7s	---	---	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---	---	---
73012:								
Gravois	3e	73.00	66.00	3.60	27.00	3.60	3.80	30.00
73035:								
Gravois	4e	65.00	58.00	3.60	20.00	3.60	3.80	23.00
73088:								
Rueter	4s	---	---	4.40	---	4.00	4.60	---
73089:								
Rueter	7e	---	---	4.40	---	4.00	4.60	---
73090:								
Useful	3e	84.00	73.00	5.60	31.00	5.30	5.50	34.00
73091:								
Useful	4e	70.00	61.00	5.60	26.00	5.30	5.50	28.00
73092:								
Gatewood	4e	---	---	4.40	---	4.00	4.60	---
73093:								
Gatewood	6e	---	---	4.40	---	4.00	4.60	---
73094:								
Gatewood	7e	---	---	4.40	---	4.00	4.60	---
73095:								
Gravois	6e	---	---	3.60	---	3.60	3.80	---
73097:								
Swiss	7e	---	---	4.40	---	4.00	4.60	---
73098:								
Plato	2e	75.00	66.00	4.50	28.00	5.00	6.00	31.00

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grain sorghum	Orchardgrass-red clover*	Soybeans	Tall fescue	Warm-season grasses**	Winter wheat
		Bu	Bu	Tons***	Bu	Tons***	Tons***	Bu
73106:								
Mariosa	2w	87.00	76.00	4.50	32.00	5.00	6.00	35.00
73108:								
Gravois	3e	73.00	66.00	3.60	27.00	3.60	3.80	30.00
Gatewood	4e	---	---	4.40	---	4.00	4.60	---
73109:								
Alred	7e	---	---	4.40	---	4.00	4.60	---
73112:								
Gunlock	3e	75.00	68.00	3.60	29.00	3.60	3.80	34.00
73135:								
Union	3e	70.00	63.00	3.60	24.00	3.60	3.80	28.00
73136:								
Union	2e	80.00	73.00	3.60	30.00	3.60	3.80	35.00
73158:								
Cotton	3e	76.00	68.00	4.50	29.00	5.00	6.00	32.00
73165:								
Knobby	7s	---	---	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---	---	---
Bardley	7e	---	---	---	---	---	---	---
73168:								
Swiss	6e	---	---	4.40	---	4.00	4.60	---
73192:								
Beemont	4e	---	---	4.40	---	4.00	4.60	---
73193:								
Beemont	6e	---	---	4.40	---	4.00	4.60	---
73194:								
Beemont	7e	---	---	4.40	---	4.00	4.60	---
73195:								
Useful	3e	---	---	5.60	---	5.30	5.50	---
Moko	6s	---	---	---	---	1.00	1.40	---
73196:								
Mariosa	2e	82.00	71.00	4.50	28.00	5.00	6.00	30.00
74633:								
Hartville	2e	97.00	85.00	5.80	36.00	5.30	7.30	39.00
74634:								
Hartville	3e	91.00	81.00	6.50	34.00	6.00	7.30	37.00
74656:								
Deible	2e	91.00	81.00	5.80	34.00	5.30	7.30	37.00
75376:								
Cedargap	3w	---	---	1.00	---	2.00	2.50	22.00

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grain sorghum	Orchardgrass-red clover*	Soybeans	Tall fescue	Warm-season grasses**	Winter wheat
		Bu	Bu	Tons***	Bu	Tons***	Tons***	Bu
75389: Hacreek	2w	124.00	110.00	6.40	37.00	5.00	6.60	49.00
75395: Jamesfin	2w	108.00	94.00	6.60	40.00	5.00	6.40	44.00
75398: Kaintuck	5w	---	---	6.60	---	5.00	6.40	---
75399: Jamesfin	2w	91.00	81.00	6.60	34.00	5.00	6.40	37.00
75400: Gladden	3w	65.00	57.00	6.60	24.00	5.00	6.40	26.00
75408: Secesh	2s	95.00	85.00	6.60	35.00	5.00	6.40	40.00
99000. Pits, quarries								
99001. Water								

* Alsike clover should be substituted for red clover on somewhat poorly drained and poorly drained soils.

** Average yield of all suitable native warm-season grasses.

*** Yields are for total above-ground production.

Table 6.--Pasture and Hayland Suitability Groups

Map symbol	Soil name	Component name	Pasture and hayland suitability group
64000	Racoon silt loam, 0 to 3 percent slopes, rarely flooded	Racoon	WLB
64001	Freeburg silt loam, 0 to 3 percent slopes, rarely flooded	Freeburg	WLO
66003	Jemerson silt loam, 0 to 2 percent slopes, rarely flooded	Jemerson	LyO
66005	Deible silt loam, 0 to 2 percent slopes, rarely flooded	Deible	WCB
70028	Moko-Rock outcrop complex, 3 to 15 percent slopes, very stony	Moko	ShU
		Rock outcrop	GNS
70029	Moko-Rock outcrop complex, 15 to 50 percent slopes, very stony	Moko	GNS
		Rock outcrop	GNS
73012	Gravois silt loam, 3 to 8 percent slopes	Gravois	LyP
73035	Gravois silt loam, 8 to 15 percent slopes	Gravois	LyP
73088	Rueter very gravelly silt loam, 8 to 15 percent slopes, very stony	Rueter	GrU
73089	Rueter very gravelly silt loam, 15 to 35 percent slopes, very stony	Rueter	GrU
73090	Useful silt loam, 3 to 8 percent slopes	Useful	CyU
73091	Useful silt loam, 8 to 15 percent slopes, eroded	Useful	CyU
73092	Gatewood very gravelly silt loam, 3 to 8 percent slopes, stony	Gatewood	MDU
73093	Gatewood very gravelly silt loam, 8 to 15 percent slopes, stony	Gatewood	MDU
73094	Gatewood very gravelly silt loam, 15 to 35 percent slopes, stony	Gatewood	MDU
73095	Gravois silt loam, 15 to 20 percent slopes	Gravois	LyP
73097	Swiss gravelly silt loam, 15 to 35 percent slopes, stony	Swiss	GrU
73098	Plato silt loam, 1 to 3 percent slopes	Plato	WtP
73106	Mariosa silt loam, 0 to 2 percent slopes	Mariosa	WtP
73108	Gravois-Gatewood complex, 3 to 8 percent slopes	Gravois	LyP
		Gatewood	MDU
73109	Alred gravelly silt loam, 15 to 35 percent slopes, stony	Alred	GrU
73112	Gunlock silt loam, 3 to 8 percent slopes	Gunlock	LyP
73135	Union silt loam, 3 to 8 percent slopes	Union	LyP
73136	Union silt loam, 1 to 3 percent slopes	Union	LyP
73158	Cotton silt loam, 3 to 8 percent slopes, footslopes	Cotton	WtP
73165	Knobby-Rock outcrop-Bardley complex, 35 to 75 percent slopes, extremely stony	Knobby	GNS
		Rock outcrop	GNS
		Bardley	GNS
73168	Swiss gravelly silt loam, 3 to 15 percent slopes, stony	Swiss	GrU
73192	Beemont gravelly silt loam, 3 to 8 percent slopes, stony	Beemont	GrU
73193	Beemont very gravelly silt loam, 8 to 15 percent slopes, stony	Beemont	GrU
73194	Beemont very gravelly silt loam, 15 to 35 percent slopes, stony	Beemont	GrU
73195	Useful-Moko complex, 3 to 8 percent slopes	Useful	CyU
		Moko	ShU
73196	Mariosa silt loam, 1 to 3 percent slopes, eroded	Mariosa	WtP
74633	Hartville silt loam, 1 to 3 percent slopes	Hartville	WCB
74634	Hartville silt loam, 3 to 8 percent slopes	Hartville	WCU
74656	Deible silt loam, 1 to 5 percent slopes, rarely flooded	Deible	WCB
75376	Cedargap gravelly silt loam, 0 to 3 percent slopes, frequently flooded	Cedargap	GrO
75389	Hacreek silt loam, 0 to 2 percent slopes, rarely flooded	Hacreek	WLO
75395	Jamesfin silt loam, 0 to 3 percent slopes, occasionally flooded	Jamesfin	LyO
75398	Kaintuck fine sandy loam, 0 to 3 percent slopes, frequently flooded	Kaintuck	LyO
75399	Jamesfin silt loam, 0 to 3 percent slopes, frequently flooded	Jamesfin	LyO
75400	Gladden silt loam, 0 to 3 percent slopes, frequently flooded	Gladden	LyO
75408	Secesh silt loam, 0 to 3 percent slopes, rarely flooded	Secesh	LyO
99000	Pits, quarries	Pits, quarries	---
99001	Water	Water	GNS

Table 7.--Forest Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available.)

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber	
			cu ft/ac	
64000:				
Racoon	Green ash	---	---	Pin oak, red maple
	Pin oak	80	57	
	Post oak	80	57	
	White oak	---	---	
64001:				
Freeburg	White oak	65	43	Black oak, eastern cottonwood, green ash, pecan, pin oak, white oak
66003:				
Jemerson	Black oak	65	43	Black oak, green ash, northern red oak
	Northern red oak	60	43	
	White oak	65	43	
66005:				
Deible	Eastern cottonwood	100	129	Eastern cottonwood, green ash, pin oak, silver maple
	Pin oak	75	57	
	Silver maple	95	43	
70028, 70029:				
Moko	Eastern redcedar	30	29	Eastern redcedar
Rock outcrop.				
73012:				
Gravois	Black oak	60	43	Black oak, northern red oak, white oak
	Northern red oak	60	43	
	White oak	57	43	
73035:				
Gravois	Black oak	58	43	Northern red oak, white oak
	Northern red oak	62	43	
	White oak	50	43	
73088, 73089:				
Rueter	Black oak	61	43	Northern red oak, white oak
	Northern red oak	61	43	
	White oak	58	43	
73090:				
Useful	Black oak	---	---	Black oak, northern red oak, white oak
	Northern red oak	---	---	
	Post oak	---	---	
	White oak	61	43	
73091:				
Useful	Black oak	---	---	Black oak, northern red oak, white oak
	Northern red oak	---	---	
	Post oak	---	---	
	Sugar maple	---	---	
	White oak	61	43	

Table 7.--Forest Productivity--Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber	
			cu ft/ac	
73092, 73093, 73094:				
Gatewood	Black oak	42	29	Eastern redcedar, shortleaf pine
	Eastern redcedar	40	43	
	Post oak	43	29	
	White oak	45	29	
73095:				
Gravois	Black oak	58	43	Northern red oak, scarlet oak, white oak
	Northern red oak	62	43	
	White oak	50	43	
73097:				
Swiss	Eastern redcedar	---	---	Eastern redcedar, northern red oak, shortleaf pine
	Northern red oak	61	43	
	Post oak	---	---	
	White oak	48	29	
73098:				
Plato	Black oak	60	43	Black oak, post oak, shortleaf pine
	Post oak	---	---	
	White oak	55	43	
73108:				
Gravois	Black oak	58	43	Northern red oak, scarlet oak, shortleaf pine, white oak
	Northern red oak	62	43	
	White oak	50	43	
Gatewood	Black oak	42	29	Eastern redcedar, shortleaf pine
	Eastern redcedar	40	43	
	Post oak	43	29	
	White oak	45	29	
73109:				
Alred	Black oak	53	43	Black oak, shortleaf pine
	Post oak	---	---	
	White oak	48	29	
73112:				
Gunlock	Black oak	60	43	Black oak, northern red oak, white oak
	Northern red oak	60	43	
	White oak	57	43	
73135, 73136:				
Union	Black oak	58	43	Northern red oak, scarlet oak, shortleaf pine, white oak
	Northern red oak	62	43	
	White oak	50	43	
73158:				
Cotton	White oak	55	43	Black oak, pin oak, white ash, white oak
73165:				
Knobby.				
Rock outcrop.				
Bardley	Black oak	54	43	Black oak, eastern redcedar, shortleaf pine
	Post oak	45	29	
	White oak	42	29	

Table 7.--Forest Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Volume of wood fiber (cu ft/ac)	Trees to manage
73168:				
Swiss	Eastern redcedar	---	---	Eastern redcedar,
	Northern red oak	61	43	northern red oak,
	Post oak	---	---	shortleaf pine
	White oak	48	29	
73192:				
Beemont	Eastern redcedar	---	---	Eastern redcedar,
	Northern red oak	61	43	northern red oak,
	Post oak	---	---	shortleaf pine
	White oak	48	29	
73193:				
Beemont	Eastern redcedar	---	---	Eastern redcedar,
	Northern red oak	61	43	northern red oak,
	Post oak	---	---	shortleaf pine
	White oak	48	29	
73194:				
Beemont	Eastern redcedar	---	---	Eastern redcedar,
	Northern red oak	61	43	northern red oak,
	Post oak	---	---	shortleaf pine
	White oak	48	29	
73195:				
Useful	Black oak	---	---	Black oak, northern
	Northern red oak	---	---	red oak, white oak
	Post oak	---	---	
	Sugar maple	---	---	
	White oak	61	43	
Moko	Eastern redcedar	30	29	Eastern redcedar
74633, 74634:				
Hartville	Green ash	---	---	Eastern cottonwood,
	Pin oak	---	---	green ash, pin
	Silver maple	---	---	oak, silver maple
	White oak	55	43	
74656:				
Deible	Green ash	---	---	Eastern cottonwood,
	Northern red oak	---	---	green ash, pin
	Pin oak	76	57	oak, silver maple
	Silver maple	---	---	
75376:				
Cedargap	Shumard's oak	---	---	Shumard's oak,
	Black oak	66	43	black walnut,
	Black walnut	---	---	green ash, white
	Green ash	---	---	oak
75395:				
Jamesfin	American sycamore	---	---	Black walnut,
	Black walnut	90	57	eastern
	Eastern cottonwood	---	---	cottonwood, green
	River birch	---	---	ash
	White ash	102	57	

Table 7.--Forest Productivity--Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber	
			cu ft/ac	
75398:				
Kaintuck	American basswood	---	---	American sycamore, black walnut, green ash, white ash
	American sycamore	90	100	
	Black walnut	---	---	
	River birch	---	---	
75399:				
Jamesfin	American sycamore	---	---	Black walnut, eastern cottonwood, green ash
	Black walnut	90	57	
	Eastern cottonwood	---	---	
	Green ash	---	---	
	River birch	---	---	
	White ash	102	57	
75400:				
Gladden	American sycamore	85	86	Black walnut, green ash, white oak
	Black walnut	---	---	
	White oak	75	57	
75408:				
Secesh	American sycamore	---	---	American sycamore, black walnut, green ash
	Black oak	---	---	
	Black walnut	---	---	
	White oak	60	43	

Table 8a.--Forest 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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Very limited: seasonal wetness (very limited)	1.00	Very limited: seasonal wetness (very limited)	1.00	Very limited: seasonal wetness (very limited)	1.00
					low strength (moderately limited)	0.50			low strength (moderately limited)	0.50
64001:										
Freeburg	Not limited		Not limited		Moderately limited: low strength (moderately limited)	0.50	Slightly limited: seasonal wetness (slightly limited)	0.25	Moderately limited: low strength (moderately limited)	0.50
					seasonal wetness (slightly limited)	0.25			seasonal wetness (slightly limited)	0.25
66003:										
Jemerson	Not limited		Not limited		Moderately limited: low strength (moderately limited)	0.50	Not limited		Moderately limited: low strength (moderately limited)	0.50
66005:										
Deible	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited)	0.91
					low strength (moderately limited)	0.50			low strength (moderately limited)	0.50
70028:										
Moko	Slightly limited: small stones (slightly limited)	0.13	Very limited: restrictive layer (very limited)	1.00	Not limited		Very limited: restrictive layer (very limited)	1.00	Moderately limited: slippage potential (moderately limited)	0.50
			surface stones (moderately limited)	0.45					slope (moderately limited)	0.45
			slope (moderately limited)	0.34						
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70029:										
Moko	Slightly limited: slope (slightly limited) small stones (slightly limited)	 0.23 0.08	Very limited: slope (very limited) surface stones (moderately limited) small stones (slightly limited)	 1.00 0.45 0.08	Limited: slope (limited)	 0.87	Limited: slope (limited)	 0.87	Very limited: slope (very limited) slippage potential (moderately limited)	 1.00 0.50
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Not limited		Slightly limited: slope (slightly limited)	 0.10	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	 0.50 0.26	Slightly limited: seasonal wetness (slightly limited)	 0.26	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	 0.50 0.26
73035:										
Gravois	Not limited		Moderately limited: slope (moderately limited)	 0.43	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	 0.50 0.26	Slightly limited: seasonal wetness (slightly limited)	 0.26	Limited: slope (limited) low strength (moderately limited) seasonal wetness (slightly limited)	 0.68 0.50 0.26
73088:										
Rueter	Moderately limited: small stones (moderately limited)	 0.53	Moderately limited: small stones (moderately limited) slope (moderately limited) surface stones (moderately limited)	 0.53 0.47 0.45	Not limited		Moderately limited: small stones (moderately limited)	 0.49	Limited: slope (limited) slippage potential (moderately limited)	 0.76 0.50
73089:										
Rueter	Moderately limited: small stones (moderately limited) slope (slightly limited)	 0.53 0.14	Limited: slope (limited) small stones (moderately limited) surface stones (moderately limited)	 0.99 0.53 0.45	Moderately limited: slope (moderately limited)	 0.60	Moderately limited: slope (moderately limited) small stones (moderately limited)	 0.60 0.49	Very limited: slope (very limited) slippage potential (moderately limited)	 1.00 0.50

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73090:										
Useful	Not limited		Slightly limited: slope (slightly limited)	0.10	Moderately limited: low strength (moderately limited)	0.50	Not limited		Moderately limited: low strength (moderately limited)	0.50
73091:										
Useful	Not limited		Moderately limited: slope (moderately limited)	0.47	Moderately limited: low strength (moderately limited)	0.50	Not limited		Limited: slope (limited) low strength (moderately limited)	0.76 0.50
73092:										
Gatewood	Moderately limited: small stones (moderately limited)	0.42	Moderately limited: small stones (moderately limited) slope (slightly limited) surface stones (slightly limited)	0.42 0.20 0.02	Slightly limited: seasonal wetness (slightly limited)	0.15	Slightly limited: small stones (slightly limited) seasonal wetness (slightly limited)	0.30 0.15	Slightly limited: slope (slightly limited) seasonal wetness (slightly limited)	0.15 0.15
73093:										
Gatewood	Moderately limited: small stones (moderately limited)	0.42	Moderately limited: slope (moderately limited) small stones (moderately limited) surface stones (slightly limited)	0.47 0.42 0.02	Slightly limited: seasonal wetness (slightly limited)	0.15	Slightly limited: small stones (slightly limited) seasonal wetness (slightly limited)	0.30 0.15	Limited: slope (limited) seasonal wetness (slightly limited)	0.76 0.15
73094:										
Gatewood	Moderately limited: small stones (moderately limited) slope (slightly limited)	0.42 0.14	Limited: slope (limited) small stones (moderately limited) surface stones (slightly limited)	0.99 0.42 0.02	Moderately limited: slope (moderately limited) seasonal wetness (slightly limited)	0.60 0.15	Moderately limited: slope (moderately limited) small stones (slightly limited) seasonal wetness (slightly limited)	0.60 0.30 0.15	Very limited: slope (very limited) seasonal wetness (slightly limited)	1.00 0.15

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73095:										
Gravois	Slightly limited: slope (slightly limited)	0.04	Limited: slope (limited)	0.68	Moderately limited: low strength (moderately limited)	0.50	Slightly limited: seasonal wetness (slightly limited)	0.26	Very limited: slope (very limited)	1.00
					seasonal wetness (slightly limited)	0.26	slope (slightly limited)	0.15	low strength (moderately limited)	0.50
					slope (slightly limited)	0.15			seasonal wetness (slightly limited)	0.26
73097:										
Swiss	Slightly limited: slope (slightly limited) small stones (slightly limited)	0.14 0.02	Limited: slope (limited) small stones (slightly limited) surface stones (slightly limited)	0.99 0.02 0.02	Moderately limited: slope (moderately limited) low strength (moderately limited)	0.60 0.50	Moderately limited: slope (moderately limited)	0.60	Very limited: slope (very limited) low strength (moderately limited)	1.00 0.50
73098:										
Plato	Not limited		Not limited		Moderately limited: seasonal wetness (moderately limited) low strength (moderately limited)	0.56 0.50	Moderately limited: seasonal wetness (moderately limited)	0.56	Moderately limited: seasonal wetness (moderately limited) low strength (moderately limited)	0.56 0.50
73106:										
Mariosa	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: seasonal wetness (limited) low strength (moderately limited)	0.91 0.50	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited) low strength (moderately limited)	0.91 0.50
73108:										
Gravois	Not limited		Slightly limited: slope (slightly limited)	0.10	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.26	Slightly limited: seasonal wetness (slightly limited)	0.26	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.26

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73108:										
Gatewood	Moderately limited: small stones (moderately limited)	0.42	Moderately limited: small stones (moderately limited)	0.42	Slightly limited: seasonal wetness (slightly limited)	0.15	Slightly limited: small stones (slightly limited)	0.30	Slightly limited: seasonal wetness (slightly limited)	0.15
			slope (slightly limited)	0.10			seasonal wetness (slightly limited)	0.15		
			surface stones (slightly limited)	0.02						
73109:										
Alred	Slightly limited: slope (slightly limited)	0.14	Limited: slope (limited)	0.99	Moderately limited: slope (moderately limited)	0.60	Moderately limited: slope (moderately limited)	0.60	Very limited: slope (very limited)	1.00
	small stones (slightly limited)	0.13	small stones (slightly limited)	0.13	low strength (moderately limited)	0.50			low strength (moderately limited)	0.50
			surface stones (slightly limited)	0.02						
73112:										
Gunlock	Not limited		Slightly limited: slope (slightly limited)	0.10	Moderately limited: low strength (moderately limited)	0.50	Slightly limited: seasonal wetness (slightly limited)	0.28	Moderately limited: low strength (moderately limited)	0.50
					seasonal wetness (slightly limited)	0.28			seasonal wetness (slightly limited)	0.28
73135:										
Union	Not limited		Slightly limited: slope (slightly limited)	0.10	Moderately limited: low strength (moderately limited)	0.50	Slightly limited: seasonal wetness (slightly limited)	0.28	Moderately limited: low strength (moderately limited)	0.50
					seasonal wetness (slightly limited)	0.28			seasonal wetness (slightly limited)	0.28
73136:										
Union	Not limited		Not limited		Moderately limited: low strength (moderately limited)	0.50	Slightly limited: seasonal wetness (slightly limited)	0.28	Moderately limited: low strength (moderately limited)	0.50
					seasonal wetness (slightly limited)	0.28			seasonal wetness (slightly limited)	0.28

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73158:										
Cotton	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited); slope (slightly limited)	0.60; 0.20	Limited: seasonal wetness (limited); low strength (moderately limited)	0.85; 0.50	Limited: seasonal wetness (limited)	0.85	Limited: seasonal wetness (limited); low strength (moderately limited); slope (slightly limited)	0.85; 0.50; 0.15
73165:										
Knobby	Moderately limited: very sandy (surface) (moderately limited); slope (moderately limited); surface stones (slightly limited)	0.50; 0.46; 0.30	Very limited: slope (very limited); restrictive layer (very limited); surface stones (limited)	1.00; 1.00; 0.66	Very limited: slope (very limited); very sandy (surface) (moderately limited); large surface stones (slightly limited)	1.00; 0.50; 0.30	Very limited: slope (very limited); restrictive layer (very limited); large surface stones (slightly limited)	1.00; 1.00; 0.30	Very limited: slope (very limited); very sandy (surface) (moderately limited); slippage potential (moderately limited)	1.00; 0.50; 0.50
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Moderately limited: slope (moderately limited); surface stones (moderately limited); small stones (slightly limited)	0.46; 0.42; 0.24	Very limited: slope (very limited); surface stones (limited); small stones (slightly limited)	1.00; 0.79; 0.24	Very limited: slope (very limited); large surface stones (moderately limited)	1.00; 0.60	Very limited: slope (very limited); large surface stones (moderately limited); small stones (slightly limited)	1.00; 0.60; 0.01	Very limited: slope (very limited); large surface stones (moderately limited); surface stones (moderately limited)	1.00; 0.60; 0.42
73168:										
Swiss	Slightly limited: small stones (slightly limited)	0.03	Moderately limited: slope (moderately limited); small stones (slightly limited); surface stones (slightly limited)	0.39; 0.03; 0.02	Moderately limited: low strength (moderately limited)	0.50	Not limited		Moderately limited: slope (moderately limited); low strength (moderately limited)	0.60; 0.50

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73192:										
Beemont	Slightly limited: small stones (slightly limited)	0.04	Slightly limited: slope (slightly limited); small stones (slightly limited); surface stones (slightly limited)	0.10; 0.04; 0.02	Moderately limited: low strength (moderately limited); seasonal wetness (slightly limited)	0.50; 0.10	Slightly limited: seasonal wetness (slightly limited)	0.10	Moderately limited: low strength (moderately limited); seasonal wetness (slightly limited)	0.50; 0.10
73193:										
Beemont	Slightly limited: small stones (slightly limited)	0.13	Moderately limited: slope (moderately limited); small stones (slightly limited); surface stones (slightly limited)	0.47; 0.13; 0.02	Slightly limited: seasonal wetness (slightly limited)	0.10	Slightly limited: seasonal wetness (slightly limited)	0.10	Limited: slope (limited); seasonal wetness (slightly limited)	0.76; 0.10
73194:										
Beemont	Slightly limited: slope (slightly limited); small stones (slightly limited)	0.14; 0.13	Limited: slope (limited); small stones (slightly limited); surface stones (slightly limited)	0.99; 0.13; 0.02	Moderately limited: slope (moderately limited); seasonal wetness (slightly limited)	0.60; 0.10	Moderately limited: slope (moderately limited); seasonal wetness (slightly limited)	0.60; 0.10	Very limited: slope (very limited); seasonal wetness (slightly limited)	1.00; 0.10
73195:										
Useful	Not limited		Slightly limited: slope (slightly limited)	0.10	Moderately limited: low strength (moderately limited)	0.50	Not limited		Moderately limited: low strength (moderately limited)	0.50
Moko	Slightly limited: small stones (slightly limited)	0.08	Slightly limited: slope (slightly limited); small stones (slightly limited); surface stones (slightly limited)	0.10; 0.08; 0.02	Not limited		Not limited		Moderately limited: slippage potential (moderately limited)	0.50
73196:										
Mariosa	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: seasonal wetness (limited); low strength (moderately limited)	0.91; 0.50	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited); low strength (moderately limited)	0.91; 0.50

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
74633:										
Hartville	Not limited		Not limited		Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.29	Slightly limited: seasonal wetness (slightly limited)	0.29	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.29
74634:										
Hartville	Not limited		Slightly limited: slope (slightly limited)	0.10	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.29	Slightly limited: seasonal wetness (slightly limited)	0.29	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.29
74656:										
Deible	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: seasonal wetness (limited) low strength (moderately limited)	0.91 0.50	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited) low strength (moderately limited)	0.91 0.50
75376:										
Cedargap	Slightly limited: small stones (slightly limited)	0.03	Slightly limited: small stones (slightly limited)	0.03	Moderately limited: low strength (moderately limited)	0.50	Not limited		Very limited: flooding (very limited) low strength (moderately limited)	1.00 0.50
75389:										
Hacreek	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: seasonal wetness (limited) low strength (moderately limited)	0.62 0.50	Limited: seasonal wetness (limited)	0.62	Limited: seasonal wetness (limited) low strength (moderately limited)	0.62 0.50
75395:										
Jamesfin	Not limited		Not limited		Moderately limited: low strength (moderately limited)	0.50	Not limited		Moderately limited: flooding (moderately limited) low strength (moderately limited)	0.60 0.50
75398:										
Kaintuck	Not limited		Not limited		Not limited		Not limited		Very limited: flooding (very limited)	1.00

Table 8a.--Forest Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75399:										
Jamesfin	Not limited		Not limited		Moderately limited: low strength (moderately limited)	0.50	Not limited		Very limited: flooding (very limited) low strength (moderately limited)	1.00 0.50
75400:										
Gladden	Not limited		Not limited		Moderately limited: low strength (moderately limited)	0.50	Not limited		Very limited: flooding (very limited) low strength (moderately limited)	1.00 0.50
75408:										
Secesh	Not limited		Not limited		Moderately limited: low strength (moderately limited)	0.50	Not limited		Moderately limited: slippage potential (moderately limited) low strength (moderately limited)	0.50 0.50
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 8b.--Forest 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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Very limited: seasonal wetness (very limited) low strength (limited)	1.00 0.80	Very limited: seasonal wetness (very limited) low strength (moderately limited)	1.00 0.50	Very limited: seasonal wetness (very limited)	1.00
64001:										
Freeburg	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: low strength (limited) seasonal wetness (slightly limited)	0.80 0.25	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.25	Not limited	
66003:										
Jemerson	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: low strength (limited)	0.80	Moderately limited: low strength (moderately limited)	0.50	Not limited	
66005:										
Deible	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: seasonal wetness (limited) low strength (limited)	0.91 0.80	Limited: seasonal wetness (limited) low strength (moderately limited)	0.91 0.50	Limited: seasonal wetness (limited)	0.91
70028:										
Moko	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.18	Moderately limited: low strength (moderately limited)	0.50	Moderately limited: slippage potential (moderately limited) slope (moderately limited)	0.50 0.45	Very limited: droughty (very limited)	1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 8b.--Forest Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70029:										
Moko	Very limited: slope/erodibility (very limited)	1.00	Limited: slope/erodibility (limited)	0.63	Not limited		Very limited: slope (very limited) slippage potential (moderately limited)	1.00 0.50	Very limited: droughty (very limited)	1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited) seasonal wetness (slightly limited)	0.80 0.26	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.26	Not limited	
73035:										
Gravois	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.27	Limited: low strength (limited) seasonal wetness (slightly limited)	0.80 0.26	Limited: slope (limited) low strength (moderately limited) seasonal wetness (slightly limited)	0.68 0.50 0.26	Not limited	
73088:										
Rueter	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.24	Not limited		Limited: slope (limited) slippage potential (moderately limited)	0.76 0.50	Slightly limited: droughty (slightly limited) soil reaction (slightly limited)	0.19 0.18
73089:										
Rueter	Very limited: slope/erodibility (very limited)	1.00	Moderately limited: slope/erodibility (moderately limited)	0.49	Not limited		Very limited: slope (very limited) slippage potential (moderately limited)	1.00 0.50	Slightly limited: droughty (slightly limited) soil reaction (slightly limited)	0.19 0.18
73090:										
Useful	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited)	0.80	Moderately limited: low strength (moderately limited)	0.50	Not limited	

Table 8b.--Forest Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73091:										
Useful	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.29	Limited: low strength (limited)	0.80	Limited: slope (limited); low strength (moderately limited)	0.76; 0.50	Not limited	
73092:										
Gatewood	Limited: slope/erodibility (limited)	0.78	Slightly limited: slope/erodibility (slightly limited)	0.14	Slightly limited: seasonal wetness (slightly limited)	0.15	Slightly limited: slope (slightly limited); seasonal wetness (slightly limited)	0.15; 0.15	Not limited	
73093:										
Gatewood	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.24	Slightly limited: seasonal wetness (slightly limited)	0.15	Limited: slope (limited); seasonal wetness (slightly limited)	0.76; 0.15	Not limited	
73094:										
Gatewood	Very limited: slope/erodibility (very limited)	1.00	Moderately limited: slope/erodibility (moderately limited)	0.49	Slightly limited: seasonal wetness (slightly limited)	0.15	Very limited: slope (very limited); seasonal wetness (slightly limited)	1.00; 0.15	Not limited	
73095:										
Gravois	Very limited: slope/erodibility (very limited)	1.00	Moderately limited: slope/erodibility (moderately limited)	0.41	Limited: low strength (limited); seasonal wetness (slightly limited)	0.80; 0.26	Very limited: slope (very limited); low strength (moderately limited); seasonal wetness (slightly limited)	1.00; 0.50; 0.26	Not limited	
73097:										
Swiss	Very limited: slope/erodibility (very limited)	1.00	Moderately limited: slope/erodibility (moderately limited)	0.49	Limited: low strength (limited)	0.80	Very limited: slope (very limited); low strength (moderately limited)	1.00; 0.50	Not limited	

Table 8b.--Forest Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73098:										
Plato	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: low strength (limited)	0.80	Moderately limited: seasonal wetness (moderately limited)	0.56	Moderately limited: seasonal wetness (moderately limited)	0.51
					seasonal wetness (moderately limited)	0.56	low strength (moderately limited)	0.50		
73106:										
Mariosa	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited)	0.91
					low strength (limited)	0.80	low strength (moderately limited)	0.50		
73108:										
Gravois	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited)	0.80	Moderately limited: low strength (moderately limited)	0.50	Not limited	
					seasonal wetness (slightly limited)	0.26	seasonal wetness (slightly limited)	0.26		
Gatewood	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.12	Slightly limited: seasonal wetness (slightly limited)	0.15	Slightly limited: seasonal wetness (slightly limited)	0.15	Not limited	
73109:										
Alred	Very limited: slope/erodibility (very limited)	1.00	Moderately limited: slope/erodibility (moderately limited)	0.49	Limited: low strength (limited)	0.80	Very limited: slope (very limited)	1.00	Slightly limited: droughty (slightly limited)	0.08
							low strength (moderately limited)	0.50		
73112:										
Gunlock	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited)	0.80	Moderately limited: low strength (moderately limited)	0.50	Not limited	
					seasonal wetness (slightly limited)	0.28	seasonal wetness (slightly limited)	0.28		
73135:										
Union	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited)	0.80	Moderately limited: low strength (moderately limited)	0.50	Not limited	
					seasonal wetness (slightly limited)	0.28	seasonal wetness (slightly limited)	0.28		

Table 8b.--Forest Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73136:										
Union	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: low strength (limited) seasonal wetness (slightly limited)	0.80 0.28	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.28	Not limited	
73158:										
Cotton	Limited: slope/erodibility (limited)	0.78	Slightly limited: slope/erodibility (slightly limited)	0.17	Limited: seasonal wetness (limited) low strength (limited)	0.85 0.80	Limited: seasonal wetness (limited) low strength (moderately limited) slope (slightly limited)	0.85 0.50 0.15	Limited: seasonal wetness (limited)	0.85
73165:										
Knobby	Very limited: slope/erodibility (very limited)	1.00	Limited: slope/erodibility (limited)	0.88	Not limited		Very limited: slope (very limited) slippage potential (moderately limited) very sandy (surface) (moderately limited)	1.00 0.50 0.50	Very limited: droughty (very limited) soil reaction (limited)	1.00 0.60
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Very limited: slope/erodibility (very limited)	1.00	Limited: slope/erodibility (limited)	0.88	Not limited		Very limited: slope (very limited) large surface stones (moderately limited) surface stones (moderately limited)	1.00 0.60 0.42	Not limited	
73168:										
Swiss	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.20	Limited: low strength (limited)	0.80	Moderately limited: slope (moderately limited) low strength (moderately limited)	0.60 0.50	Not limited	

Table 8b.--Forest Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73192:										
Beemont	Moderately limited: slope/erodibility (moderately limited)	0.38	Slightly limited: slope/erodibility (slightly limited)	0.12	Limited: low strength (limited); seasonal wetness (slightly limited)	0.80; 0.10	Moderately limited: low strength (moderately limited); seasonal wetness (slightly limited)	0.50; 0.10	Not limited	
73193:										
Beemont	Limited: slope/erodibility (limited)	0.75	Slightly limited: slope/erodibility (slightly limited)	0.24	Slightly limited: seasonal wetness (slightly limited)	0.10	Limited: slope (limited); seasonal wetness (slightly limited)	0.76; 0.10	Not limited	
73194:										
Beemont	Very limited: slope/erodibility (very limited)	1.00	Moderately limited: slope/erodibility (moderately limited)	0.49	Slightly limited: seasonal wetness (slightly limited)	0.10	Very limited: slope (very limited); seasonal wetness (slightly limited)	1.00; 0.10	Not limited	
73195:										
Useful	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited)	0.80	Moderately limited: low strength (moderately limited)	0.50	Not limited	
Moko	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.12	Not limited		Moderately limited: slippage potential (moderately limited)	0.50	Very limited: droughty (very limited)	1.00
73196:										
Mariosa	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: seasonal wetness (limited); low strength (limited)	0.91; 0.80	Limited: seasonal wetness (limited); low strength (moderately limited)	0.91; 0.50	Limited: seasonal wetness (limited)	0.91
74633:										
Hartville	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: low strength (limited); seasonal wetness (slightly limited)	0.80; 0.29	Moderately limited: low strength (moderately limited); seasonal wetness (slightly limited)	0.50; 0.29	Not limited	

Table 8b.--Forest Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
74634:										
Hartville	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited) seasonal wetness (slightly limited)	0.80 0.29	Moderately limited: low strength (moderately limited) seasonal wetness (slightly limited)	0.50 0.29	Not limited	
74656:										
Deible	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: seasonal wetness (limited) low strength (limited)	0.91 0.80	Limited: seasonal wetness (limited) low strength (moderately limited)	0.91 0.50	Limited: seasonal wetness (limited)	0.91
75376:										
Cedargap	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.80	Very limited: flooding (very limited) low strength (moderately limited)	1.00 0.50	Limited: flooding (limited)	0.90
75389:										
Hacreek	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited) seasonal wetness (limited)	0.80 0.62	Limited: seasonal wetness (limited) low strength (moderately limited)	0.62 0.50	Limited: seasonal wetness (limited)	0.62
75395:										
Jamesfin	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.80	Moderately limited: flooding (moderately limited) low strength (moderately limited)	0.60 0.50	Moderately limited: flooding (moderately limited)	0.60
75398:										
Kaintuck	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.04	Moderately limited: low strength (moderately limited)	0.50	Very limited: flooding (very limited)	1.00	Limited: flooding (limited)	0.90
75399:										
Jamesfin	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.80	Very limited: flooding (very limited) low strength (moderately limited)	1.00 0.50	Limited: flooding (limited)	0.90

Table 8b.--Forest Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75400:										
Gladden	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.04	Limited: low strength (limited)	0.80	Very limited: flooding (very limited) low strength (moderately limited)	1.00 0.50	Limited: flooding (limited)	0.90
75408:										
Secesh	Slightly limited: slope/erodibility (slightly limited)	0.17	Slightly limited: slope/erodibility (slightly limited)	0.03	Limited: low strength (limited)	0.80	Moderately limited: slippage potential (moderately limited) low strength (moderately limited)	0.50 0.50	Not limited	
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 9.--Windbreaks and Environmental Plantings

(Only the soils suitable for windbreaks and environmental plantings are listed. Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
64000:					
Racoon	buttonbush	possumhaw	nannyberry, eastern arborvitae, eastern redcedar	common hackberry, baldcypress, pin oak	eastern cottonwood
64001:					
Freeburg	American plum, fragrant sumac	blackhaw, gray dogwood	Washington hawthorn, nannyberry, eastern redcedar	baldcypress, green ash, sweetgum	eastern white pine, pin oak
66003:					
Jemerson	silky dogwood	American cranberrybush, gray dogwood	Washington hawthorn, eastern redcedar, blue spruce, white fir	Austrian pine, Norway spruce, eastern white pine	pin oak
66005:					
Deible	buttonbush	possumhaw	nannyberry, eastern arborvitae, eastern redcedar	common hackberry, baldcypress, pin oak	eastern cottonwood
73012, 73035:					
Gravois	common lilac, fragrant sumac	Amur maple, gray dogwood	common hackberry, eastern redcedar	Norway spruce, green ash, honeylocust, pin oak, eastern white pine	---
73088, 73089:					
Rueter	common lilac, fragrant sumac	American plum, gray dogwood	bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	shortleaf pine	---
73090, 73091:					
Useful	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
73092, 73093, 73094:					
Gatewood	common lilac, fragrant sumac	American plum, gray dogwood	bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	---	---
73095:					
Gravois	common lilac, fragrant sumac	Amur maple, gray dogwood	common hackberry, eastern redcedar	Norway spruce, green ash, honeylocust, pin oak, eastern white pine	---
73097:					
Swiss	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
73098:					
Plato	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
73106:					
Mariosa	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
73108:					
Gravois	American plum, common lilac, fragrant sumac	Washington hawthorn, gray dogwood, Amur maple	Austrian pine, Virginia pine, common hackberry, eastern redcedar, shingle oak, honeylocust	---	---
Gatewood.					
73112:					
Gunlock	common lilac, fragrant sumac	Amur maple, gray dogwood	common hackberry, eastern redcedar	Norway spruce, green ash, honeylocust, pin oak, eastern white pine	---
73135:					
Union	American plum, common lilac, fragrant sumac	Washington hawthorn, gray dogwood, Amur maple	Austrian pine, Virginia pine, common hackberry, eastern redcedar, honeylocust	---	---
73136:					
Union	American plum, common lilac, fragrant sumac	Washington hawthorn, gray dogwood, Amur maple	Austrian pine, Virginia pine, common hackberry, eastern redcedar, honeylocust	shortleaf pine	---
73158:					
Cotton	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
73165:					
Knobby.					
Rock outcrop.					
Bardley	common lilac, fragrant sumac	American plum, gray dogwood	bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	---	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
73168: Swiss	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
73192, 73193, 73194: Beemont	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
73195: Useful	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
Moko.					
73196: Mariosa	common lilac, fragrant sumac	American plum, gray dogwood	bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	---	---
74633, 74634: Hartville	common lilac, fragrant sumac	American plum, gray dogwood	bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	---	---
74656: Deible	buttonbush	possumhaw	nannyberry, eastern arborvitae, eastern redcedar	common hackberry, baldcypress, pin oak	eastern cottonwood
75376: Cedargap	common lilac, fragrant sumac	American plum, gray dogwood	bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	shortleaf pine	---
75389: Hacreek	American plum, fragrant sumac, silky dogwood	blackhaw, gray dogwood	Washington hawthorn, eastern arborvitae	baldcypress, green ash, sweetgum	eastern white pine, pin oak
75395: Jamesfin	American plum, fragrant sumac	blackhaw, gray dogwood	Washington hawthorn, nannyberry, eastern redcedar	baldcypress, green ash, sweetgum	eastern white pine, pin oak
75398: Kaintuck	American plum, fragrant sumac	blackhaw, gray dogwood	Washington hawthorn, nannyberry, eastern redcedar	baldcypress, green ash, sweetgum	eastern white pine, pin oak

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
75399: Jamesfin	American plum, fragrant sumac	blackhaw, gray dogwood	Washington hawthorn, nannyberry, eastern redcedar	baldcypress, green ash, sweetgum	eastern white pine, pin oak
75400: Gladden	American plum, fragrant sumac	blackhaw, gray dogwood	Washington hawthorn, nannyberry, eastern redcedar	baldcypress, green ash, sweetgum	eastern white pine, pin oak
75408: Secesh	American plum, fragrant sumac	blackhaw, gray dogwood	Washington hawthorn, nannyberry, eastern redcedar	baldcypress, green ash, sweetgum	eastern white pine, pin oak

Table 10.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:								
Racoon	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	flooding (rare)	0.90	percs slowly	0.39	percs slowly	0.39		
	(limited)		(moderately limited)		(moderately limited)			
	percs slowly	0.39						
	(moderately limited)							
64001:								
Freeburg	Limited:		Moderately limited:		Limited:		Moderately limited:	
	flooding (rare)	0.90	wetness	0.45	wetness	0.75	wetness	0.45
	(limited)		(moderately limited)		(limited)		(moderately limited)	
	wetness	0.75	percs slowly	0.13	percs slowly	0.13		
	(limited)		(slightly limited)		(slightly limited)			
	percs slowly	0.13						
	(slightly limited)							
66003:								
Jemerson	Limited:		Not limited		Not limited		Not limited	
	flooding (rare)	0.90						
	(limited)							
66005:								
Deible	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	flooding (rare)	0.90						
	(limited)							
70028:								
Moko	Limited:		Limited:		Very limited:		Limited:	
	shallow to bedrock	0.90	shallow to bedrock	0.90	shallow to bedrock	1.00	large surface stones	0.79
	(limited)		(limited)		(very limited)		(limited)	
	large surface stones	0.79	large surface stones	0.79	slope	1.00		
	(limited)		(limited)		(very limited)			
	small stones	0.64	small stones	0.64	small stones	1.00		
	(limited)		(limited)		(very limited)			
Rock outcrop	Not rated		Not rated		Not rated		Not rated	
70029:								
Moko	Very limited:		Very limited:		Very limited:		Very limited:	
	slope	1.00	slope	1.00	slope	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	shallow to bedrock	0.90	shallow to bedrock	0.90	shallow to bedrock	1.00	large surface stones	0.79
	(limited)		(limited)		(very limited)		(limited)	
	large surface stones	0.79	large surface stones	0.79	small stones	1.00	too clayey	0.60
	(limited)		(limited)		(very limited)		(moderately limited)	
Rock outcrop	Not rated		Not rated		Not rated		Not rated	

Table 10.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73012:								
Gravois	Limited:		Moderately limited:		Limited:		Moderately limited:	
	wetness	0.81	wetness	0.49	slope	0.98	wetness	0.49
	(limited)		(moderately limited)		(limited)		(moderately limited)	
	percs slowly	0.39	percs slowly	0.39	wetness	0.81		
	(moderately limited)		(moderately limited)		(limited)			
					percs slowly	0.39		
					(moderately limited)			
73035:								
Gravois	Limited:		Moderately limited:		Very limited:		Moderately limited:	
	wetness	0.81	wetness	0.49	slope	1.00	wetness	0.49
	(limited)		(moderately limited)		(very limited)		(moderately limited)	
	percs slowly	0.39	percs slowly	0.39	wetness	0.81		
	(moderately limited)		(moderately limited)		(limited)			
	slope	0.37	slope	0.37	percs slowly	0.39		
	(moderately limited)		(moderately limited)		(moderately limited)			
73088:								
Rueter	Very limited:		Very limited:		Very limited:		Limited:	
	small stones	1.00	small stones	1.00	small stones	1.00	large surface stones	0.79
	(very limited)		(very limited)		(very limited)		(limited)	
	large surface stones	0.79	large surface stones	0.79	slope	1.00	small stones	0.49
	(limited)		(limited)		(very limited)		(moderately limited)	
	too acid	0.71	too acid	0.71	too acid	0.71		
	(limited)		(limited)		(limited)			
73089:								
Rueter	Very limited:		Very limited:		Very limited:		Limited:	
	slope	1.00	slope	1.00	small stones	1.00	slope	0.92
	(very limited)		(very limited)		(very limited)		(limited)	
	small stones	1.00	small stones	1.00	slope	1.00	large surface stones	0.79
	(very limited)		(very limited)		(very limited)		(limited)	
	large surface stones	0.79	large surface stones	0.79	too acid	0.71	small stones	0.49
	(limited)		(limited)		(limited)		(moderately limited)	
73090:								
Useful	Slightly limited:		Slightly limited:		Limited:		Not limited	
	percs slowly	0.13	percs slowly	0.13	slope	0.98		
	(slightly limited)		(slightly limited)		(limited)			
					percs slowly	0.13		
					(slightly limited)			
73091:								
Useful	Limited:		Limited:		Very limited:		Not limited	
	slope	0.63	slope	0.63	slope	1.00		
	(limited)		(limited)		(very limited)			
	percs slowly	0.13	percs slowly	0.13	percs slowly	0.13		
	(slightly limited)		(slightly limited)		(slightly limited)			
73092:								
Gatewood	Very limited:		Very limited:		Very limited:		Slightly limited:	
	small stones	1.00	small stones	1.00	small stones	1.00	small stones	0.30
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	percs slowly	0.40	percs slowly	0.40	slope	1.00	large surface stones	0.13
	(moderately limited)		(moderately limited)		(very limited)		(slightly limited)	
	wetness	0.35	large surface stones	0.13	depth to bedrock	0.42	wetness	0.13
	(moderately limited)		(slightly limited)		(moderately limited)		(slightly limited)	

Table 10.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73093:								
Gatewood	Very limited:		Very limited:		Very limited:		Slightly limited:	
	small stones (very limited)	1.00	small stones (very limited)	1.00	small stones (very limited)	1.00	small stones (slightly limited)	0.30
	slope (limited)	0.63	slope (limited)	0.63	slope (very limited)	1.00	large surface stones (slightly limited)	0.13
	percs slowly (moderately limited)	0.40	percs slowly (moderately limited)	0.40	depth to bedrock (moderately limited)	0.42	wetness (slightly limited)	0.13
73094:								
Gatewood	Very limited:		Very limited:		Very limited:		Limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	small stones (very limited)	1.00	slope (limited)	0.92
	small stones (very limited)	1.00	small stones (very limited)	1.00	slope (very limited)	1.00	small stones (slightly limited)	0.30
	percs slowly (moderately limited)	0.40	percs slowly (moderately limited)	0.40	depth to bedrock (moderately limited)	0.42	large surface stones (slightly limited)	0.13
73095:								
Gravois	Very limited:		Very limited:		Very limited:		Moderately limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	wetness (moderately limited)	0.49
	wetness (limited)	0.81	wetness (moderately limited)	0.49	wetness (limited)	0.81	slope (slightly limited)	0.25
	percs slowly (moderately limited)	0.39	percs slowly (moderately limited)	0.39	percs slowly (moderately limited)	0.39		
73097:								
Swiss	Very limited:		Very limited:		Very limited:		Limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (limited)	0.92
	percs slowly (very limited)	1.00	percs slowly (very limited)	1.00	percs slowly (very limited)	1.00	large surface stones (slightly limited)	0.13
	small stones (slightly limited)	0.23	small stones (slightly limited)	0.23	small stones (very limited)	1.00		
73098:								
Plato	Very limited:		Limited:		Very limited:		Limited:	
	wetness (very limited)	1.00	wetness (limited)	0.94	wetness (very limited)	1.00	wetness (limited)	0.94
	percs slowly (slightly limited)	0.13	percs slowly (slightly limited)	0.13	percs slowly (slightly limited)	0.13		
73106:								
Mariosa	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	percs slowly (moderately limited)	0.39	percs slowly (moderately limited)	0.39	percs slowly (moderately limited)	0.39		
73108:								
Gravois	Limited:		Moderately limited:		Limited:		Moderately limited:	
	wetness (limited)	0.81	wetness (moderately limited)	0.49	slope (limited)	0.98	wetness (moderately limited)	0.49
	percs slowly (moderately limited)	0.39	percs slowly (moderately limited)	0.39	wetness (limited)	0.81		
					percs slowly (moderately limited)	0.39		

Table 10.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73108:								
Gatewood	Very limited:		Very limited:		Very limited:		Slightly limited:	
	small stones (very limited)	1.00	small stones (very limited)	1.00	small stones (very limited)	1.00	small stones (slightly limited)	0.30
	percs slowly (moderately limited)	0.40	percs slowly (moderately limited)	0.40	slope (limited)	0.98	large surface stones (slightly limited)	0.13
	wetness (moderately limited)	0.35	large surface stones (slightly limited)	0.13	depth to bedrock (moderately limited)	0.42	wetness (slightly limited)	0.13
73109:								
Alred	Very limited:		Very limited:		Very limited:		Limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (limited)	0.92
	small stones (limited)	0.64	small stones (limited)	0.64	small stones (very limited)	1.00	large surface stones (slightly limited)	0.13
	too acid (slightly limited)	0.18	too acid (slightly limited)	0.18	too acid (slightly limited)	0.18		
73112:								
Gunlock	Limited:		Moderately limited:		Limited:		Moderately limited:	
	wetness (limited)	0.90	wetness (moderately limited)	0.56	slope (limited)	0.98	wetness (moderately limited)	0.56
	percs slowly (slightly limited)	0.13	percs slowly (slightly limited)	0.13	wetness (limited)	0.90		
					percs slowly (slightly limited)	0.13		
73135:								
Union	Limited:		Moderately limited:		Limited:		Moderately limited:	
	wetness (limited)	0.90	wetness (moderately limited)	0.56	slope (limited)	0.98	wetness (moderately limited)	0.56
					wetness (limited)	0.90		
73136:								
Union	Limited:		Moderately limited:		Limited:		Moderately limited:	
	wetness (limited)	0.90	wetness (moderately limited)	0.56	wetness (limited)	0.90	wetness (moderately limited)	0.56
73158:								
Cotton	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	percs slowly (moderately limited)	0.39	percs slowly (moderately limited)	0.39	slope (very limited)	1.00		
					percs slowly (moderately limited)	0.39		
73165:								
Knobby	Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	large surface stones (very limited)	1.00	large surface stones (very limited)	1.00	shallow to bedrock (very limited)	1.00	large surface stones (very limited)	1.00
	shallow to bedrock (limited)	0.90	shallow to bedrock (limited)	0.90	small stones (very limited)	1.00	large stones (slightly limited)	0.03
Rock outcrop	Not rated		Not rated		Not rated		Not rated	

Table 10.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73165:								
Bardley	Very limited:		Very limited:		Very limited:		Very limited:	
	slope	1.00	slope	1.00	small stones	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	large surface stones	1.00	large surface stones	1.00	slope	1.00	large surface stones	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	small stones	1.00	small stones	1.00	depth to bedrock	0.46	small stones	0.01
	(limited)		(limited)		(moderately limited)		(slightly limited)	
73168:								
Swiss	Very limited:		Very limited:		Very limited:		Slightly limited:	
	percs slowly	1.00	percs slowly	1.00	percs slowly	1.00	large surface stones	0.13
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	small stones	0.30	small stones	0.30	slope	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
	slope	0.16	slope	0.16	small stones	1.00		
	(slightly limited)		(slightly limited)		(very limited)			
73192:								
Beemont	Very limited:		Very limited:		Very limited:		Slightly limited:	
	percs slowly	1.00	percs slowly	1.00	percs slowly	1.00	large surface stones	0.13
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	small stones	0.33	small stones	0.33	small stones	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
	large surface stones	0.13	large surface stones	0.13	slope	0.98		
	(slightly limited)		(slightly limited)		(limited)			
73193:								
Beemont	Very limited:		Very limited:		Very limited:		Slightly limited:	
	percs slowly	1.00	percs slowly	1.00	small stones	1.00	large surface stones	0.13
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	small stones	0.65	small stones	0.65	slope	1.00		
	(limited)		(limited)		(very limited)			
	slope	0.63	slope	0.63	percs slowly	1.00		
	(limited)		(limited)		(very limited)			
73194:								
Beemont	Very limited:		Very limited:		Very limited:		Limited:	
	percs slowly	1.00	percs slowly	1.00	small stones	1.00	slope	0.92
	(very limited)		(very limited)		(very limited)		(limited)	
	slope	1.00	slope	1.00	slope	1.00	large surface stones	0.13
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	small stones	0.65	small stones	0.65	percs slowly	1.00		
	(limited)		(limited)		(very limited)			
73195:								
Useful	Slightly limited:		Slightly limited:		Limited:		Not limited	
	percs slowly	0.13	percs slowly	0.13	slope	0.98		
	(slightly limited)		(slightly limited)		(limited)			
					percs slowly	0.13		
					(slightly limited)			
Moko	Limited:		Limited:		Very limited:		Moderately limited:	
	shallow to bedrock	0.90	shallow to bedrock	0.90	shallow to bedrock	1.00	too clayey	0.60
	(limited)		(limited)		(very limited)		(moderately limited)	
	too clayey	0.60	too clayey	0.60	small stones	1.00	large surface stones	0.13
	(moderately limited)		(moderately limited)		(very limited)		(slightly limited)	
	percs slowly	0.57	percs slowly	0.57	slope	0.98		
	(moderately limited)		(moderately limited)		(limited)			

Table 10.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73196:								
Mariosa	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	1.00	percs slowly	1.00	percs slowly	1.00		
	(very limited)		(very limited)		(very limited)			
74633:								
Hartville	Limited:		Limited:		Limited:		Limited:	
	wetness	0.96	wetness	0.60	wetness	0.96	wetness	0.60
	(limited)		(limited)		(limited)		(limited)	
	percs slowly	0.39	percs slowly	0.39	percs slowly	0.39		
	(moderately limited)		(moderately limited)		(moderately limited)			
74634:								
Hartville	Limited:		Limited:		Limited:		Limited:	
	wetness	0.96	wetness	0.60	slope	0.98	wetness	0.60
	(limited)		(limited)		(limited)		(limited)	
	percs slowly	0.39	percs slowly	0.39	wetness	0.96		
	(moderately limited)		(moderately limited)		(limited)			
					percs slowly	0.39		
					(moderately limited)			
74656:								
Deible	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	flooding (rare)	0.90						
	(limited)							
75376:								
Cedargap	Very limited:		Moderately limited:		Very limited:		Moderately limited:	
	flooding	1.00	flooding	0.60	flooding	1.00	flooding	0.60
	(very limited)		(moderately limited)		(very limited)		(moderately limited)	
	small stones	0.27	small stones	0.27	small stones	1.00		
	(slightly limited)		(slightly limited)		(very limited)			
					large stones	0.01		
					(slightly limited)			
75389:								
Hacreek	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	flooding (rare)	0.90	percs slowly	0.13	percs slowly	0.13		
	(limited)		(slightly limited)		(slightly limited)			
	percs slowly	0.13						
	(slightly limited)							
75395:								
Jamesfin	Very limited:		Not limited		Moderately limited:		Not limited	
	flooding	1.00			flooding	0.60		
	(very limited)				(moderately limited)			
75398:								
Kaintuck	Very limited:		Moderately limited:		Very limited:		Moderately limited:	
	flooding	1.00	flooding	0.60	flooding	1.00	flooding	0.60
	(very limited)		(moderately limited)		(very limited)		(moderately limited)	

Table 10.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75399:								
Jamesfin	Very limited: flooding (very limited)	1.00	Moderately limited: flooding (moderately limited)	0.60	Very limited: flooding (very limited)	1.00	Moderately limited: flooding (moderately limited)	0.60
75400:								
Gladden	Very limited: flooding (very limited)	1.00	Moderately limited: flooding (moderately limited)	0.60	Very limited: flooding (very limited)	1.00	Moderately limited: flooding (moderately limited)	0.60
75408:								
Secesh	Limited: flooding (rare) (limited)	0.90	Not limited		Not limited		Not limited	
99000:								
Pits, quarries	Not rated		Not rated		Not rated		Not rated	
99001:								
Water	Not rated		Not rated		Not rated		Not rated	

Table 11a.--Wildlife Habitat

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Very limited: wetness (very limited) percs slowly (moderately limited)	1.00 0.39	Very limited: wetness (very limited) percs slowly (moderately limited)	1.00 0.39	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
64001:										
Freeburg	Moderately limited: wetness (moderately limited) percs slowly (slightly limited)	0.53 0.13	Moderately limited: wetness (moderately limited) percs slowly (slightly limited)	0.53 0.13	Moderately limited: wetness (moderately limited)	0.53	Moderately limited: wetness (moderately limited)	0.53	Limited: wetness (limited)	0.79
66003:										
Jemerson	Not limited		Not limited		Not limited		Not limited		Not limited	
66005:										
Deible	Very limited: wetness (very limited) droughty (very limited)	1.00 1.00	Very limited: wetness (very limited) droughty (slightly limited)	1.00 0.20	Very limited: wetness (very limited) droughty (slightly limited)	1.00 0.20	Very limited: wetness (very limited) droughty (slightly limited)	1.00 0.20	Very limited: wetness (very limited) droughty (slightly limited)	1.00 0.20
70028:										
Moko	Very limited: droughty (very limited) shallow to bedrock (very limited) high erodibility (limited)	1.00 1.00 0.80	Very limited: droughty (very limited) shallow to bedrock (very limited) high erodibility (limited)	1.00 1.00 0.80	Very limited: droughty (very limited) small stones (slightly limited)	1.00 0.13	Very limited: droughty (very limited) shallow to bedrock (very limited)	1.00 1.00	Very limited: shallow to bedrock (very limited) droughty (very limited)	1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70029:										
Moko	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	droughty	1.00	droughty	1.00	droughty	1.00	droughty	1.00	shallow to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shallow to bedrock	1.00	shallow to bedrock	1.00	small stones	0.08	shallow to bedrock	1.00	droughty	1.00
	(very limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
	slope	0.87	slope	0.87	too clayey	0.05	too clayey	0.05		
	(limited)		(limited)		(slightly limited)		(slightly limited)			
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Limited:		Moderately limited:		Moderately limited:		Moderately limited:		Limited:	
	droughty	0.83	wetness	0.55	wetness	0.55	wetness	0.55	wetness	0.85
	(limited)		(moderately limited)		(moderately limited)		(moderately limited)		(limited)	
	wetness	0.55	moderate erodibility	0.50						
	(moderately limited)		(moderately limited)							
	moderate erodibility	0.50	percs slowly	0.39						
	(moderately limited)		(moderately limited)							
73035:										
Gravois	Limited:		Limited:		Moderately limited:		Moderately limited:		Limited:	
	droughty	0.83	high erodibility	0.80	wetness	0.55	wetness	0.55	wetness	0.85
	(limited)		(limited)		(moderately limited)		(moderately limited)		(limited)	
	high erodibility	0.80	wetness	0.55						
	(limited)		(moderately limited)							
	wetness	0.55	percs slowly	0.39						
	(moderately limited)		(moderately limited)							
73088:										
Rueter	Very limited:		Very limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	droughty	1.00	small stones	1.00	small stones	0.53	small stones	0.49	droughty	0.43
	(very limited)		(very limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	small stones	1.00	high erodibility	0.80	droughty	0.43	droughty	0.43		
	(very limited)		(limited)		(moderately limited)		(moderately limited)			
	high erodibility	0.80	droughty	0.43						
	(limited)		(moderately limited)							

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73089:										
Rueter	Very limited:		Very limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	droughty	1.00	small stones	1.00	small stones	0.53	small stones	0.49	droughty	0.43
	(very limited)		(very limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	small stones	1.00	high erodibility	0.80	droughty	0.43	droughty	0.43		
	(very limited)		(limited)		(moderately limited)		(moderately limited)			
	high erodibility	0.80	slope	0.60						
	(limited)		(moderately limited)							
73090, 73091:										
Useful	Limited:		Limited:		Slightly limited:		Slightly limited:		Moderately limited:	
	high erodibility	0.80	high erodibility	0.80	wetness	0.13	wetness	0.13	wetness	0.37
	(limited)		(limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	wetness	0.13	wetness	0.13						
	(slightly limited)		(slightly limited)							
	percs slowly	0.13	percs slowly	0.13						
	(slightly limited)		(slightly limited)							
73092, 73093:										
Gatewood	Very limited:		Very limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	droughty	1.00	small stones	1.00	small stones	0.42	depth to bedrock	0.42	wetness	0.51
	(very limited)		(very limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	small stones	1.00	high erodibility	0.80	wetness	0.36	wetness	0.36	depth to bedrock	0.42
	(very limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	high erodibility	0.80	depth to bedrock	0.42	droughty	0.22	small stones	0.30	droughty	0.22
	(limited)		(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)	
73094:										
Gatewood	Very limited:		Very limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	droughty	1.00	small stones	1.00	small stones	0.42	depth to bedrock	0.42	wetness	0.51
	(very limited)		(very limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	small stones	1.00	high erodibility	0.80	wetness	0.36	wetness	0.36	depth to bedrock	0.42
	(very limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	high erodibility	0.80	slope	0.60	droughty	0.22	small stones	0.30	droughty	0.22
	(limited)		(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)	
73095:										
Gravois	Limited:		Limited:		Moderately limited:		Moderately limited:		Limited:	
	droughty	0.83	high erodibility	0.80	wetness	0.55	wetness	0.55	wetness	0.85
	(limited)		(limited)		(moderately limited)		(moderately limited)		(limited)	
	high erodibility	0.80	wetness	0.55						
	(limited)		(moderately limited)							
	wetness	0.55	percs slowly	0.39						
	(moderately limited)		(moderately limited)							

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73097:										
Swiss	Very limited:		Very limited:		Slightly limited:		Slightly limited:		Moderately limited:	
	percs slowly (very limited)	1.00	percs slowly (very limited)	1.00	wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	wetness (moderately limited)	0.37
	droughty (limited)	0.99	high erodibility (limited)	0.80	small stones (slightly limited)	0.02				
	high erodibility (limited)	0.80	slope (moderately limited)	0.60						
73098:										
Plato	Very limited:		Limited:		Limited:		Limited:		Very limited:	
	droughty (very limited)	1.00	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94	wetness (very limited)	1.00
	wetness (limited)	0.94	droughty (slightly limited)	0.24	droughty (slightly limited)	0.24	droughty (slightly limited)	0.24	droughty (slightly limited)	0.24
	percs slowly (slightly limited)	0.13	percs slowly (slightly limited)	0.13						
73106:										
Mariosa	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	droughty (very limited)	1.00	droughty (limited)	0.94	droughty (limited)	0.94	droughty (limited)	0.94	droughty (limited)	0.94
	percs slowly (moderately limited)	0.39	percs slowly (moderately limited)	0.39						
73108:										
Gravois	Limited:		Moderately limited:		Moderately limited:		Moderately limited:		Limited:	
	droughty (limited)	0.83	wetness (moderately limited)	0.55	wetness (moderately limited)	0.55	wetness (moderately limited)	0.55	wetness (limited)	0.85
	wetness (moderately limited)	0.55	moderate erodibility (moderately limited)	0.50						
	moderate erodibility (moderately limited)	0.50	percs slowly (moderately limited)	0.39						
Gatewood	Very limited:		Very limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	droughty (very limited)	1.00	small stones (very limited)	1.00	small stones (moderately limited)	0.42	depth to bedrock (moderately limited)	0.42	wetness (moderately limited)	0.51
	small stones (very limited)	1.00	moderate erodibility (moderately limited)	0.50	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	depth to bedrock (moderately limited)	0.42
	moderate erodibility (moderately limited)	0.50	depth to bedrock (moderately limited)	0.42	droughty (slightly limited)	0.22	small stones (slightly limited)	0.30	droughty (slightly limited)	0.22

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73109:										
Alred	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	droughty	1.00	droughty	1.00	droughty	1.00	droughty	1.00	droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	high erodibility	0.80	high erodibility	0.80	small stones	0.13				
	(limited)		(limited)		(slightly limited)					
	small stones	0.64	small stones	0.64						
	(limited)		(limited)							
73112:										
Gunlock	Limited:		Limited:		Moderately limited:		Moderately limited:		Limited:	
	droughty	0.99	high erodibility	0.80	wetness	0.58	wetness	0.58	wetness	0.93
	(limited)		(limited)		(moderately limited)		(moderately limited)		(limited)	
	high erodibility	0.80	wetness	0.58						
	(limited)		(moderately limited)							
	wetness	0.58	percs slowly	0.13						
	(moderately limited)		(slightly limited)							
73135:										
Union	Limited:		Limited:		Moderately limited:		Moderately limited:		Limited:	
	high erodibility	0.80	high erodibility	0.80	wetness	0.58	wetness	0.58	wetness	0.93
	(limited)		(limited)		(moderately limited)		(moderately limited)		(limited)	
	wetness	0.58	wetness	0.58						
	(moderately limited)		(moderately limited)							
	droughty	0.17								
	(slightly limited)									
73136:										
Union	Moderately limited:		Moderately limited:		Moderately limited:		Moderately limited:		Limited:	
	wetness	0.58	wetness	0.58	wetness	0.58	wetness	0.58	wetness	0.93
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(limited)	
	moderate erodibility	0.50	moderate erodibility	0.50						
	(moderately limited)		(moderately limited)							
	droughty	0.17								
	(slightly limited)									
73158:										
Cotton	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	droughty	0.92	high erodibility	0.80						
	(limited)		(limited)							
	high erodibility	0.80	percs slowly	0.39						
	(limited)		(moderately limited)							

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73165:										
Knobby----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	droughty	1.00	droughty	1.00	droughty	1.00	droughty	1.00	shallow to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shallow to bedrock	1.00	shallow to bedrock	1.00	small stones	0.10	shallow to bedrock	1.00	droughty	1.00
	(very limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
	slope	1.00	slope	1.00	large stones	0.03	large stones	0.03	large stones	0.03
	(very limited)		(very limited)		(slightly limited)		(slightly limited)		(slightly limited)	
Rock outcrop----	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley---------	Very limited:		Very limited:		Limited:		Limited:		Limited:	
	droughty	1.00	slope	1.00	droughty	0.66	droughty	0.66	droughty	0.66
	(very limited)		(very limited)		(limited)		(limited)		(limited)	
	slope	1.00	small stones	1.00	small stones	0.24	depth to bedrock	0.46	depth to bedrock	0.46
	(very limited)		(limited)		(slightly limited)		(moderately limited)		(moderately limited)	
	small stones	1.00	high erodibility	0.80			small stones	0.01		
	(limited)		(limited)				(slightly limited)			
73168:										
Swiss----------	Very limited:		Very limited:		Slightly limited:		Slightly limited:		Moderately limited:	
	percs slowly	1.00	percs slowly	1.00	wetness	0.13	wetness	0.13	wetness	0.37
	(very limited)		(very limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	droughty	0.99	high erodibility	0.80	small stones	0.03				
	(limited)		(limited)		(slightly limited)					
	high erodibility	0.80	small stones	0.30						
	(limited)		(moderately limited)							
73192:										
Beemont---------	Very limited:		Very limited:		Slightly limited:		Slightly limited:		Moderately limited:	
	percs slowly	1.00	percs slowly	1.00	wetness	0.28	wetness	0.28	wetness	0.45
	(very limited)		(very limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	high erodibility	0.80	high erodibility	0.80	small stones	0.04				
	(limited)		(limited)		(slightly limited)					
	droughty	0.39	small stones	0.33						
	(moderately limited)		(moderately limited)							
73193, 73194:										
Beemont---------	Very limited:		Very limited:		Slightly limited:		Slightly limited:		Moderately limited:	
	percs slowly	1.00	percs slowly	1.00	wetness	0.28	wetness	0.28	wetness	0.45
	(very limited)		(very limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	high erodibility	0.80	high erodibility	0.80	small stones	0.13				
	(limited)		(limited)		(slightly limited)					
	small stones	0.65	small stones	0.65						
	(limited)		(limited)							

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73195:										
Useful	Limited: high erodibility (limited) wetness (slightly limited) percs slowly (slightly limited)	 0.80 0.13 0.13	Limited: high erodibility (limited) wetness (slightly limited) percs slowly (slightly limited)	 0.80 0.13 0.13	Slightly limited: wetness (slightly limited)	 0.13	Slightly limited: wetness (slightly limited)	 0.13	Moderately limited: wetness (moderately limited)	 0.37
Moko	Very limited: droughty (very limited) shallow to bedrock (very limited) high erodibility (limited)	 1.00 1.00 0.80	Very limited: droughty (very limited) shallow to bedrock (very limited) high erodibility (limited)	 1.00 1.00 0.80	Very limited: droughty (very limited) small stones (slightly limited) too clayey (slightly limited)	 1.00 0.08 0.06	Very limited: droughty (very limited) shallow to bedrock (very limited) too clayey (slightly limited)	 1.00 1.00 0.06	Very limited: shallow to bedrock (very limited) droughty (very limited)	 1.00 1.00
73196:										
Mariosa	Very limited: wetness (very limited) droughty (very limited) percs slowly (very limited)	 1.00 1.00 1.00	Very limited: wetness (very limited) percs slowly (very limited) droughty (limited)	 1.00 1.00 0.95	Very limited: wetness (very limited) droughty (limited)	 1.00 0.95	Very limited: wetness (very limited) droughty (limited)	 1.00 0.95	Very limited: wetness (very limited) droughty (limited)	 1.00 0.95
74633:										
Hartville	Moderately limited: wetness (moderately limited) percs slowly (moderately limited)	 0.60 0.39	Moderately limited: wetness (moderately limited) percs slowly (moderately limited)	 0.60 0.39	Moderately limited: wetness (moderately limited)	 0.60	Moderately limited: wetness (moderately limited)	 0.60	Limited: wetness (limited)	 0.99
74634:										
Hartville	Limited: high erodibility (limited) wetness (moderately limited) percs slowly (moderately limited)	 0.80 0.60 0.39	Limited: high erodibility (limited) wetness (moderately limited) percs slowly (moderately limited)	 0.80 0.60 0.39	Moderately limited: wetness (moderately limited)	 0.60	Moderately limited: wetness (moderately limited)	 0.60	Limited: wetness (limited)	 0.99

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
74656:										
Deible	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
	droughty (very limited)	1.00	moderate erodibility (moderately limited)	0.50	droughty (slightly limited)	0.20	droughty (slightly limited)	0.20	droughty (slightly limited)	0.20
	moderate erodibility (moderately limited)	0.50	droughty (slightly limited)	0.20						
75376:										
Cedargap	Limited: droughty (limited)	0.94	Limited: flooding (limited)	0.90	Slightly limited: small stones (slightly limited)	0.03	Not limited		Slightly limited: wetness (slightly limited)	0.01
	flooding (limited)	0.90	small stones (slightly limited)	0.27						
	small stones (slightly limited)	0.27								
75389:										
Hacreek	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
	percs slowly (slightly limited)	0.13	percs slowly (slightly limited)	0.13						
75395:										
Jamesfin	Moderately limited: flooding (moderately limited)	0.60	Moderately limited: flooding (moderately limited)	0.60	Not limited		Not limited		Not limited	
75398:										
Kaintuck	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Not limited		Not limited		Not limited	
	droughty (moderately limited)	0.34								
75399:										
Jamesfin	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Not limited		Not limited		Not limited	

Table 11a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75400:										
Gladden	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Not limited		Not limited		Not limited	
75408:										
Secesh	Not limited		Not limited		Not limited		Not limited		Not limited	
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 11b.--Wildlife Habitat

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Not limited	
64001:										
Freeburg	Limited: wetness (limited)	0.79	Limited: infrequent flooding (limited)	0.80	Not limited		Moderately limited: deep to water (moderately limited)	0.37	Slightly limited: seepage (slightly limited)	0.18
			deep to water (moderately limited)	0.37						
66003:										
Jemerson	Not limited		Very limited: deep to water (very limited)	1.00	Moderately limited: deep to water (moderately limited)	0.47	Very limited: deep to water (very limited)	1.00	Moderately limited: deep to water (moderately limited)	0.47
			infrequent flooding (limited)	0.80					seepage (moderately limited)	0.45
66005:										
Deible	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Slightly limited: droughty (slightly limited)	0.20	Not limited		Moderately limited: seepage (moderately limited)	0.45
	droughty (slightly limited)	0.20								
70028:										
Moko	Very limited: shallow to bedrock (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: droughty (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00
	droughty (very limited)	1.00	infrequent flooding (limited)	0.80	deep to water (very limited)	1.00			slope (very limited)	1.00
									seepage (moderately limited)	0.45
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 11b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70029:										
Moko	Very limited: shallow to bedrock (very limited) droughty (very limited)	1.00 1.00	Very limited: deep to water (very limited) infrequent flooding (limited)	1.00 0.80	Very limited: droughty (very limited) deep to water (very limited)	1.00 1.00	Very limited: deep to water (very limited)	1.00	Very limited: slope (very limited) deep to water (very limited)	1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Limited: wetness (limited)	0.85	Limited: infrequent flooding (limited) deep to water (moderately limited)	0.80 0.35	Not limited		Moderately limited: deep to water (moderately limited)	0.35	Limited: slope (limited)	0.91
73035:										
Gravois	Limited: wetness (limited)	0.85	Limited: infrequent flooding (limited) deep to water (moderately limited)	0.80 0.35	Not limited		Moderately limited: deep to water (moderately limited)	0.35	Very limited: slope (very limited)	1.00
73088, 73089:										
Rueter	Moderately limited: droughty (moderately limited)	0.43	Very limited: deep to water (very limited) infrequent flooding (limited) small stones (moderately limited)	1.00 0.80 0.49	Very limited: deep to water (very limited) small stones (moderately limited) droughty (moderately limited)	1.00 0.49 0.43	Very limited: deep to water (very limited) soil reaction (slightly limited)	1.00 0.18	Very limited: slope (very limited) deep to water (very limited) seepage (limited)	1.00 1.00 0.79
73090:										
Useful	Moderately limited: wetness (moderately limited)	0.37	Limited: deep to water (limited) infrequent flooding (limited)	0.82 0.80	Not limited		Limited: deep to water (limited)	0.82	Limited: slope (limited) seepage (slightly limited)	0.91 0.18
73091:										
Useful	Moderately limited: wetness (moderately limited)	0.37	Limited: deep to water (limited) infrequent flooding (limited)	0.82 0.80	Not limited		Limited: deep to water (limited)	0.82	Very limited: slope (very limited) seepage (slightly limited)	1.00 0.18

Table 11b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73092, 73093 73094:										
Gatewood	Moderately limited: wetness (moderately limited); depth to bedrock (moderately limited); droughty (slightly limited)	0.51; 0.42; 0.22	Limited: infrequent flooding (limited); deep to water (moderately limited); small stones (slightly limited)	0.80; 0.53; 0.30	Slightly limited: small stones (slightly limited); droughty (slightly limited)	0.30; 0.22	Moderately limited: deep to water (moderately limited)	0.53	Very limited: slope (very limited)	1.00
73095:										
Gravois	Limited: wetness (limited)	0.85	Limited: infrequent flooding (limited); deep to water (moderately limited)	0.80; 0.35	Not limited		Moderately limited: deep to water (moderately limited)	0.35	Very limited: slope (very limited)	1.00
73097:										
Swiss	Moderately limited: wetness (moderately limited)	0.37	Limited: deep to water (limited); infrequent flooding (limited)	0.82; 0.80	Not limited		Limited: deep to water (limited)	0.82	Very limited: slope (very limited)	1.00
73098:										
Plato	Very limited: wetness (very limited); droughty (slightly limited)	1.00; 0.24	Limited: infrequent flooding (limited); deep to water (slightly limited)	0.80; 0.06	Slightly limited: droughty (slightly limited)	0.24	Slightly limited: deep to water (slightly limited)	0.06	Slightly limited: seepage (slightly limited)	0.18
73106:										
Mariosa	Very limited: wetness (very limited); droughty (limited)	1.00; 0.94	Limited: infrequent flooding (limited)	0.80	Limited: droughty (limited)	0.94	Not limited		Not limited	
73108:										
Gravois	Limited: wetness (limited)	0.85	Limited: infrequent flooding (limited); deep to water (moderately limited)	0.80; 0.35	Not limited		Moderately limited: deep to water (moderately limited)	0.35	Limited: slope (limited)	0.91

Table 11b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73108:										
Gatewood	Moderately limited:		Limited:		Slightly limited:		Moderately limited:		Limited:	
	wetness	0.51	infrequent flooding	0.80	small stones	0.30	deep to water	0.53	slope	0.91
	(moderately limited)		(limited)		(slightly limited)		(moderately limited)		(limited)	
	depth to bedrock	0.42	deep to water	0.53	droughty	0.22				
	(moderately limited)		(moderately limited)		(slightly limited)					
	droughty	0.22	small stones	0.30						
	(slightly limited)		(slightly limited)							
73109:										
Alred	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	droughty	1.00	deep to water	1.00	deep to water	1.00	deep to water	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			infrequent flooding	0.80	droughty	1.00			deep to water	1.00
			(limited)		(very limited)				(very limited)	
									seepage	0.45
									(moderately limited)	
73112:										
Gunlock	Limited:		Limited:		Not limited		Moderately limited:		Limited:	
	wetness	0.93	infrequent flooding	0.80			deep to water	0.32	slope	0.91
	(limited)		(limited)				(moderately limited)		(limited)	
			deep to water	0.32					seepage	0.18
			(moderately limited)						(slightly limited)	
73135:										
Union	Limited:		Limited:		Not limited		Moderately limited:		Limited:	
	wetness	0.93	infrequent flooding	0.80			deep to water	0.32	slope	0.91
	(limited)		(limited)				(moderately limited)		(limited)	
			deep to water	0.32					seepage	0.45
			(moderately limited)						(moderately limited)	
73136:										
Union	Limited:		Limited:		Not limited		Moderately limited:		Moderately limited:	
	wetness	0.93	infrequent flooding	0.80			deep to water	0.32	seepage	0.45
	(limited)		(limited)				(moderately limited)		(moderately limited)	
			deep to water	0.32						
			(moderately limited)							
73158:										
Cotton	Very limited:		Limited:		Not limited		Not limited		Very limited:	
	wetness	1.00	infrequent flooding	0.80					slope	1.00
	(very limited)		(limited)						(very limited)	

Table 11b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73165:										
Knobby	Very limited: shallow to bedrock (very limited); droughty (very limited); large stones (slightly limited)	1.00; 1.00; 0.03	Very limited: deep to water (very limited); infrequent flooding (limited); large stones (slightly limited)	1.00; 0.80; 0.03	Very limited: droughty (very limited); deep to water (very limited); large stones (slightly limited)	1.00; 1.00; 0.03	Very limited: deep to water (very limited); soil reaction (limited)	1.00; 0.60	Very limited: slope (very limited); deep to water (very limited); soil reaction (limited)	1.00; 1.00; 0.60
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Limited: droughty (limited); depth to bedrock (moderately limited)	0.66; 0.46	Very limited: deep to water (very limited); infrequent flooding (limited); small stones (slightly limited)	1.00; 0.80; 0.01	Very limited: deep to water (very limited); droughty (limited); small stones (slightly limited)	1.00; 0.66; 0.01	Very limited: deep to water (very limited)	1.00	Very limited: slope (very limited); deep to water (very limited); seepage (moderately limited)	1.00; 1.00; 0.45
73168:										
Swiss	Moderately limited: wetness (moderately limited)	0.37	Limited: deep to water (limited); infrequent flooding (limited)	0.82; 0.80	Not limited		Limited: deep to water (limited)	0.82	Very limited: slope (very limited)	1.00
73192:										
Beemont	Moderately limited: wetness (moderately limited)	0.45	Limited: infrequent flooding (limited); deep to water (limited)	0.80; 0.60	Not limited		Limited: deep to water (limited)	0.60	Limited: slope (limited)	0.91
73193, 73194:										
Beemont	Moderately limited: wetness (moderately limited)	0.45	Limited: infrequent flooding (limited); deep to water (limited)	0.80; 0.60	Not limited		Limited: deep to water (limited)	0.60	Very limited: slope (very limited)	1.00
73195:										
Useful	Moderately limited: wetness (moderately limited)	0.37	Limited: deep to water (limited); infrequent flooding (limited)	0.82; 0.80	Not limited		Limited: deep to water (limited)	0.82	Limited: slope (limited); seepage (slightly limited)	0.91; 0.18

Table 11b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73195:										
Moko	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shallow to bedrock (very limited)	1.00	deep to water (very limited)	1.00	droughty (very limited)	1.00	deep to water (very limited)	1.00	deep to water (very limited)	1.00
	droughty (very limited)	1.00	infrequent flooding (limited)	0.80	deep to water (very limited)	1.00			slope (limited)	0.91
73196:										
Mariosa	Very limited:		Limited:		Limited:		Not limited		Not limited	
	wetness (very limited)	1.00	infrequent flooding (limited)	0.80	droughty (limited)	0.95				
	droughty (limited)	0.95								
74633:										
Hartville	Limited:		Limited:		Not limited		Slightly limited:		Not limited	
	wetness (limited)	0.99	infrequent flooding (limited)	0.80			deep to water (slightly limited)	0.30		
			deep to water (slightly limited)	0.30						
74634:										
Hartville	Limited:		Limited:		Not limited		Slightly limited:		Limited:	
	wetness (limited)	0.99	infrequent flooding (limited)	0.80			deep to water (slightly limited)	0.30	slope (limited)	0.91
			deep to water (slightly limited)	0.30						
74656:										
Deible	Very limited:		Limited:		Slightly limited:		Not limited		Moderately limited:	
	wetness (very limited)	1.00	infrequent flooding (limited)	0.80	droughty (slightly limited)	0.20			seepage (moderately limited)	0.45
	droughty (slightly limited)	0.20								
75376:										
Cedargap	Slightly limited:		Very limited:		Slightly limited:		Very limited:		Moderately limited:	
	wetness (slightly limited)	0.01	deep to water (very limited)	1.00	deep to water (slightly limited)	0.30	deep to water (very limited)	1.00	seepage (moderately limited)	0.45
			infrequent flooding (moderately limited)	0.50					deep to water (slightly limited)	0.30
75389:										
Hacreek	Very limited:		Limited:		Not limited		Not limited		Slightly limited:	
	wetness (very limited)	1.00	infrequent flooding (limited)	0.80					seepage (slightly limited)	0.18

Table 11b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75395:										
Jamesfin	Not limited		Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00
			infrequent flooding (moderately limited)	0.50					seepage (moderately limited)	0.45
75398:										
Kaintuck	Not limited		Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00
			infrequent flooding (moderately limited)	0.50					seepage (limited)	0.79
75399:										
Jamesfin	Not limited		Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00
			infrequent flooding (moderately limited)	0.50					seepage (moderately limited)	0.45
75400:										
Gladden	Not limited		Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00
			infrequent flooding (moderately limited)	0.50					seepage (moderately limited)	0.45
75408:										
Secesh	Not limited		Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00
			infrequent flooding (limited)	0.80					seepage (moderately limited)	0.45
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 12.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Very limited: wetness (very limited) flooding (very limited)	1.00 1.00	Very limited: flooding (very limited) wetness (very limited) shrink-swell (slightly limited)	1.00 1.00 0.17	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) low strength (very limited) flooding (rare) (limited)	1.00 1.00 0.90	Very limited: wetness (very limited)	1.00
64001:										
Freeburg	Very limited: flooding (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.45 0.45	Very limited: flooding (very limited) wetness (very limited) shrink-swell (moderately limited)	1.00 1.00 0.39	Very limited: flooding (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.45 0.45	Very limited: low strength (very limited) flooding (rare) (limited) wetness (moderately limited)	1.00 0.90 0.45	Moderately limited: wetness (moderately limited) too acid (slightly limited)	0.45 0.12
66003:										
Jemerson	Very limited: flooding (very limited) shrink-swell (moderately limited)	1.00 0.45	Very limited: flooding (very limited) wetness (moderately limited) shrink-swell (slightly limited)	1.00 0.47 0.29	Very limited: flooding (very limited) shrink-swell (moderately limited)	1.00 0.45	Very limited: low strength (very limited) flooding (rare) (limited) shrink-swell (moderately limited)	1.00 0.90 0.45	Not limited	
66005:										
Deible	Very limited: wetness (very limited) flooding (very limited)	1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) low strength (very limited) flooding (rare) (limited)	1.00 1.00 0.90	Very limited: wetness (very limited) droughty (slightly limited)	1.00 0.20

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70028:										
Moko	Very limited: hard bedrock <20" (very limited) slope (moderately limited)	1.00 0.45	Very limited: hard bedrock <40" (very limited) slope (moderately limited)	1.00 0.45	Very limited: hard bedrock <20" (very limited) slope (very limited)	1.00 1.00	Very limited: hard bedrock <20" (very limited) slope (slightly limited)	1.00 0.04	Very limited: shallow to bedrock (very limited) droughty (very limited) small stones (limited)	1.00 1.00 0.64
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
70029:										
Moko	Very limited: hard bedrock <20" (very limited) slope (very limited)	1.00 1.00	Very limited: hard bedrock <40" (very limited) slope (very limited)	1.00 1.00	Very limited: hard bedrock <20" (very limited) slope (very limited)	1.00 1.00	Very limited: hard bedrock <20" (very limited) slope (very limited)	1.00 1.00	Very limited: shallow to bedrock (very limited) droughty (very limited) slope (very limited)	1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Moderately limited: wetness (moderately limited) shrink-swell (moderately limited)	0.49 0.45	Very limited: wetness (very limited) shrink-swell (slightly limited)	1.00 0.27	Limited: slope (limited) wetness (moderately limited) shrink-swell (moderately limited)	0.68 0.49 0.45	Very limited: low strength (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.49 0.45	Moderately limited: wetness (moderately limited)	0.49
73035:										
Gravois	Limited: slope (limited) wetness (moderately limited) shrink-swell (moderately limited)	0.68 0.49 0.45	Very limited: wetness (very limited) slope (limited) shrink-swell (slightly limited)	1.00 0.68 0.27	Very limited: slope (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.49 0.45	Very limited: low strength (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.49 0.45	Moderately limited: wetness (moderately limited) slope (moderately limited)	0.49 0.37

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73088:										
Rueter	Limited:		Limited:		Very limited:		Limited:		Very limited:	
	slope	0.76	slope	0.76	slope	1.00	slope	0.63	small stones	1.00
	(limited)		(limited)		(very limited)		(limited)		(very limited)	
	large stones	0.29	large stones	0.29	large stones	0.29	large stones	0.29	too acid	0.84
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(limited)	
			shrink-swell	0.09					slope	0.63
			(slightly limited)						(limited)	
73089:										
Rueter	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	1.00	slope	1.00	slope	1.00	slope	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	large stones	0.29	large stones	0.29	large stones	0.29	large stones	0.29	small stones	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(very limited)	
			shrink-swell	0.09					too acid	0.84
			(slightly limited)						(limited)	
73090:										
Useful	Very limited:		Very limited:		Very limited:		Very limited:		Not limited	
	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00	low strength	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
			wetness	0.99	slope	0.68	shrink-swell	1.00		
			(limited)		(limited)		(very limited)			
			depth to bedrock	0.35						
			(moderately limited)							
73091:										
Useful	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell	1.00	shrink-swell	1.00	slope	1.00	low strength	1.00	slope	0.63
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	slope	0.76	wetness	0.99	shrink-swell	1.00	shrink-swell	1.00		
	(limited)		(limited)		(very limited)		(very limited)			
			slope	0.76			slope	0.63		
			(limited)				(limited)			
73092:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shrink-swell	1.00	hard bedrock <40"	1.00	shrink-swell	1.00	low strength	1.00	small stones	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	depth to bedrock	0.51	wetness	1.00	slope	0.83	shrink-swell	1.00	depth to bedrock	0.42
	(moderately limited)		(very limited)		(limited)		(very limited)		(moderately limited)	
	slope	0.15	shrink-swell	1.00	depth to bedrock	0.51	depth to bedrock	0.51	droughty	0.22
	(slightly limited)		(very limited)		(moderately limited)		(moderately limited)		(slightly limited)	

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73093:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shrink-swell (very limited)	1.00	hard bedrock <40" (very limited)	1.00	slope (very limited)	1.00	low strength (very limited)	1.00	small stones (very limited)	1.00
	slope (limited)	0.76	wetness (very limited)	1.00	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	slope (limited)	0.63
	depth to bedrock (moderately limited)	0.51	shrink-swell (very limited)	1.00	depth to bedrock (moderately limited)	0.51	slope (limited)	0.63	depth to bedrock (moderately limited)	0.42
73094:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shrink-swell (very limited)	1.00	hard bedrock <40" (very limited)	1.00	slope (very limited)	1.00	low strength (very limited)	1.00	slope (very limited)	1.00
	slope (very limited)	1.00	wetness (very limited)	1.00	shrink-swell (very limited)	1.00	slope (very limited)	1.00	small stones (very limited)	1.00
	depth to bedrock (moderately limited)	0.51	shrink-swell (very limited)	1.00	depth to bedrock (moderately limited)	0.51	shrink-swell (very limited)	1.00	depth to bedrock (moderately limited)	0.42
73095:										
Gravois	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	wetness (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	wetness (moderately limited)	0.49	slope (very limited)	1.00	wetness (moderately limited)	0.49	low strength (very limited)	1.00	wetness (moderately limited)	0.49
	shrink-swell (moderately limited)	0.45	shrink-swell (slightly limited)	0.27	shrink-swell (moderately limited)	0.45	wetness (moderately limited)	0.49		
73097:										
Swiss	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	slope (very limited)	1.00	slope (very limited)	1.00	shrink-swell (very limited)	1.00	low strength (very limited)	1.00	too acid (slightly limited)	0.24
			wetness (limited)	0.99			shrink-swell (very limited)	1.00	small stones (slightly limited)	0.23
73098:										
Plato	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell (very limited)	1.00	wetness (very limited)	1.00	shrink-swell (very limited)	1.00	low strength (very limited)	1.00	wetness (limited)	0.94
	wetness (limited)	0.94	shrink-swell (very limited)	1.00	wetness (limited)	0.94	shrink-swell (very limited)	1.00	droughty (slightly limited)	0.24
							wetness (limited)	0.94	too acid (slightly limited)	0.06

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73106:										
Mariosa	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) low strength (very limited)	1.00 1.00	Very limited: wetness (very limited) droughty (limited)	1.00 0.94
73108:										
Gravois	Moderately limited: wetness (moderately limited) shrink-swell (moderately limited)	0.49 0.45	Very limited: wetness (very limited) shrink-swell (slightly limited)	1.00 0.27	Limited: slope (limited) wetness (moderately limited) shrink-swell (moderately limited)	0.68 0.49 0.45	Very limited: low strength (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.49 0.45	Moderately limited: wetness (moderately limited)	0.49
Gatewood	Very limited: shrink-swell (very limited) depth to bedrock (moderately limited) wetness (slightly limited)	1.00 0.51 0.13	Very limited: hard bedrock <40" (very limited) wetness (very limited) shrink-swell (very limited)	1.00 1.00 1.00	Very limited: shrink-swell (very limited) slope (limited) depth to bedrock (moderately limited)	1.00 0.68 0.51	Very limited: low strength (very limited) shrink-swell (very limited) depth to bedrock (moderately limited)	1.00 1.00 0.51	Very limited: small stones (very limited) depth to bedrock (moderately limited) droughty (slightly limited)	1.00 0.42 0.22
73109:										
Alred	Very limited: slope (very limited)	1.00	Very limited: slope (very limited)	1.00	Very limited: slope (very limited)	1.00	Very limited: slope (very limited)	1.00	Very limited: slope (very limited) droughty (very limited) small stones (limited)	1.00 1.00 0.64
73112:										
Gunlock	Moderately limited: wetness (moderately limited) shrink-swell (moderately limited)	0.56 0.45	Very limited: wetness (very limited) shrink-swell (moderately limited)	1.00 0.45	Limited: slope (limited) wetness (moderately limited) shrink-swell (moderately limited)	0.68 0.56 0.45	Very limited: low strength (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.56 0.45	Moderately limited: wetness (moderately limited)	0.56

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73135:										
Union	Moderately limited: wetness (moderately limited) shrink-swell (moderately limited)	0.56 0.45	Very limited: wetness (very limited) shrink-swell (moderately limited)	1.00 0.45	Limited: slope (limited) wetness (moderately limited) shrink-swell (moderately limited)	0.68 0.56 0.45	Very limited: low strength (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.56 0.45	Moderately limited: wetness (moderately limited)	0.56
73136:										
Union	Moderately limited: wetness (moderately limited) shrink-swell (moderately limited)	0.56 0.45	Very limited: wetness (very limited) shrink-swell (moderately limited)	1.00 0.45	Moderately limited: wetness (moderately limited) shrink-swell (moderately limited)	0.56 0.45	Very limited: low strength (very limited) wetness (moderately limited) shrink-swell (moderately limited)	1.00 0.56 0.45	Moderately limited: wetness (moderately limited)	0.56
73158:										
Cotton	Very limited: wetness (very limited) shrink-swell (very limited) slope (slightly limited)	1.00 1.00 0.15	Very limited: wetness (very limited) shrink-swell (very limited) slope (slightly limited)	1.00 1.00 0.15	Very limited: wetness (very limited) shrink-swell (very limited) slope (limited)	1.00 1.00 0.83	Very limited: low strength (very limited) wetness (very limited) shrink-swell (very limited)	1.00 1.00 1.00	Very limited: wetness (very limited) too acid (slightly limited)	1.00 0.12
73165:										
Knobby	Very limited: hard bedrock <20" (very limited) slope (very limited) large stones (slightly limited)	1.00 1.00 0.03	Very limited: hard bedrock <40" (very limited) slope (very limited) large stones (slightly limited)	1.00 1.00 0.03	Very limited: hard bedrock <20" (very limited) slope (very limited) large stones (slightly limited)	1.00 1.00 0.03	Very limited: hard bedrock <20" (very limited) slope (very limited) large stones (slightly limited)	1.00 1.00 0.03	Very limited: slope (very limited) shallow to bedrock (very limited) droughty (very limited)	1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Very limited: slope (very limited) depth to bedrock (moderately limited) shrink-swell (moderately limited)	1.00 0.53 0.45	Very limited: hard bedrock <40" (very limited) slope (very limited) shrink-swell (moderately limited)	1.00 1.00 0.45	Very limited: slope (very limited) depth to bedrock (moderately limited) shrink-swell (moderately limited)	1.00 0.53 0.45	Very limited: low strength (very limited) slope (very limited) depth to bedrock (moderately limited)	1.00 1.00 0.53	Very limited: slope (very limited) small stones (limited) droughty (limited)	1.00 1.00 0.66

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73168:										
Swiss	Very limited:		Very limited:		Very limited:		Very limited:		Moderately limited:	
	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	slope (very limited)	1.00	low strength (very limited)	1.00	small stones (moderately limited)	0.30
	slope (moderately limited)	0.60	wetness (limited)	0.99	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	too acid (slightly limited)	0.24
			slope (moderately limited)	0.60			slope (slightly limited)	0.16	slope (slightly limited)	0.16
73192:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Moderately limited:	
	shrink-swell (very limited)	1.00	wetness (very limited)	1.00	shrink-swell (very limited)	1.00	low strength (very limited)	1.00	small stones (moderately limited)	0.33
			shrink-swell (limited)	1.00	slope (limited)	0.68	shrink-swell (very limited)	1.00	too acid (slightly limited)	0.18
			depth to bedrock (moderately limited)	0.50						
73193:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell (very limited)	1.00	wetness (very limited)	1.00	slope (very limited)	1.00	low strength (very limited)	1.00	small stones (limited)	0.65
	slope (limited)	0.76	shrink-swell (limited)	1.00	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	slope (limited)	0.63
			slope (limited)	0.76			slope (limited)	0.63	large stones (moderately limited)	0.30
73194:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shrink-swell (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	low strength (very limited)	1.00	slope (very limited)	1.00
	slope (very limited)	1.00	wetness (very limited)	1.00	shrink-swell (very limited)	1.00	slope (very limited)	1.00	small stones (limited)	0.65
			shrink-swell (limited)	1.00			shrink-swell (very limited)	1.00	large stones (moderately limited)	0.30
73195:										
Useful	Very limited:		Very limited:		Very limited:		Very limited:		Not limited	
	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	low strength (very limited)	1.00		
			wetness (limited)	0.99	slope (limited)	0.68	shrink-swell (very limited)	1.00		
			depth to bedrock (moderately limited)	0.35						

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73195:										
Moko	Very limited: hard bedrock <20" (very limited)	1.00	Very limited: hard bedrock <40" (very limited)	1.00	Very limited: hard bedrock <20" (very limited) slope (limited)	1.00 0.68	Very limited: hard bedrock <20" (very limited)	1.00	Very limited: shallow to bedrock (very limited) droughty (very limited) too clayey (moderately limited)	1.00 1.00 0.60
73196:										
Mariosa	Very limited: wetness (very limited) shrink-swell (very limited)	1.00 1.00	Very limited: wetness (very limited) shrink-swell (very limited)	1.00 1.00	Very limited: wetness (very limited) shrink-swell (very limited)	1.00 1.00	Very limited: low strength (very limited) wetness (very limited) shrink-swell (very limited)	1.00 1.00 1.00	Very limited: wetness (very limited) droughty (limited)	1.00 0.95
74633:										
Hartville	Very limited: shrink-swell (very limited) wetness (limited)	1.00 0.60	Very limited: wetness (very limited) shrink-swell (very limited)	1.00 1.00	Very limited: shrink-swell (very limited) wetness (limited)	1.00 0.60	Very limited: low strength (very limited) shrink-swell (very limited) wetness (limited)	1.00 1.00 0.60	Limited: wetness (limited)	0.60
74634:										
Hartville	Very limited: shrink-swell (very limited) wetness (limited)	1.00 0.60	Very limited: wetness (very limited) shrink-swell (very limited)	1.00 1.00	Very limited: shrink-swell (very limited) slope (limited) wetness (limited)	1.00 0.68 0.60	Very limited: low strength (very limited) shrink-swell (very limited) wetness (limited)	1.00 1.00 0.60	Limited: wetness (limited)	0.60
74656:										
Deible	Very limited: wetness (very limited) flooding (very limited)	1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) flooding (rare) (limited) low strength (limited)	1.00 0.90 0.78	Very limited: wetness (very limited) droughty (slightly limited)	1.00 0.20

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75376:										
Cedargap	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited) wetness (limited)	1.00 0.61	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited) small stones (slightly limited) large stones (slightly limited)	1.00 0.27 0.01
75389:										
Hacreek	Very limited: flooding (very limited) wetness (very limited) shrink-swell (moderately limited)	1.00 1.00 0.45	Very limited: flooding (very limited) wetness (very limited) shrink-swell (moderately limited)	1.00 1.00 0.45	Very limited: flooding (very limited) wetness (very limited) shrink-swell (moderately limited)	1.00 1.00 0.45	Very limited: low strength (very limited) wetness (very limited) flooding (rare) (limited)	1.00 1.00 0.90	Very limited: wetness (very limited)	1.00
75395:										
Jamesfin	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited) wetness (slightly limited)	1.00 0.16	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited) low strength (very limited)	1.00 1.00	Moderately limited: flooding (moderately limited)	0.60
75398:										
Kaintuck	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00
75399:										
Jamesfin	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited) wetness (slightly limited)	1.00 0.16	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited) low strength (very limited)	1.00 1.00	Very limited: flooding (very limited)	1.00
75400:										
Gladden	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75408:										
Secesh	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Limited: flooding (rare) (limited)	0.90	Not limited	
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 13.--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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Very limited: wetness (very limited) percs slowly (limited) flooding (rare) (moderately limited)	1.00 0.93 0.60	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) flooding (rare) (moderately limited) too acid (moderately limited)	1.00 0.60 0.36	Very limited: wetness (very limited) flooding (rare) (moderately limited)	1.00 0.60	Very limited: wetness (very limited) too acid (moderately limited)	1.00 0.36
64001:										
Freeburg	Very limited: wetness (very limited) percs slowly (limited) flooding (rare) (moderately limited)	1.00 0.71 0.60	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) flooding (rare) (moderately limited) too clayey (slightly limited)	1.00 0.60 0.04	Limited: wetness (limited) flooding (rare) (moderately limited)	0.90 0.60	Moderately limited: wetness (moderately limited)	0.55
66003:										
Jemerson	Moderately limited: flooding (rare) (moderately limited) wetness (moderately limited) percs slowly (slightly limited)	0.60 0.52 0.25	Moderately limited: seepage (moderately limited) wetness (moderately limited)	0.50 0.39	Moderately limited: flooding (rare) (moderately limited) wetness (slightly limited)	0.60 0.26	Moderately limited: flooding (rare) (moderately limited)	0.60	Not limited	
66005:										
Deible	Very limited: wetness (very limited) flooding (rare) (moderately limited)	1.00 0.60	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (limited) flooding (rare) (moderately limited)	1.00 0.74 0.60	Very limited: wetness (very limited) flooding (rare) (moderately limited)	1.00 0.60	Very limited: wetness (very limited) hard to pack (limited) too clayey (moderately limited)	1.00 0.70 0.51

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70028:										
Moko	Very limited: depth to bedrock (very limited) slope (slightly limited)	1.00 0.04	Very limited: depth to bedrock (very limited) slope (very limited)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (slightly limited)	1.00 0.04	Very limited: depth to bedrock (very limited) slope (slightly limited)	1.00 0.04	Very limited: depth to bedrock (very limited) small stones (limited) slope (slightly limited)	1.00 0.99 0.04
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
70029:										
Moko	Very limited: depth to bedrock (very limited) slope (very limited)	1.00 1.00	Very limited: slope (very limited) depth to bedrock (very limited)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited)	1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.73	Very limited: wetness (very limited) slope (limited)	1.00 0.91	Very limited: wetness (very limited) too clayey (very limited) too acid (slightly limited)	1.00 1.00 0.18	Limited: wetness (limited)	0.93	Very limited: too clayey (very limited) wetness (moderately limited) too acid (slightly limited)	1.00 0.57 0.18
73035:										
Gravois	Very limited: wetness (very limited) percs slowly (limited) slope (moderately limited)	1.00 0.73 0.37	Very limited: slope (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) too clayey (very limited) slope (moderately limited)	1.00 1.00 0.37	Limited: wetness (limited) slope (moderately limited)	0.93 0.37	Very limited: too clayey (very limited) wetness (moderately limited) slope (moderately limited)	1.00 0.57 0.37
73088:										
Rueter	Limited: slope (limited) large stones (slightly limited) percs slowly (slightly limited)	0.63 0.29 0.25	Very limited: slope (very limited) seepage (very limited)	1.00 1.00	Limited: too clayey (limited) large stones (limited) slope (limited)	0.92 0.63 0.63	Limited: seepage (limited) slope (limited)	0.75 0.63	Limited: too clayey (limited) slope (limited) small stones (moderately limited)	0.83 0.63 0.59

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73089:										
Rueter	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	1.00	slope	1.00	slope	1.00	slope	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	large stones	0.29	seepage	1.00	too clayey	0.92	seepage	0.75	too clayey	0.83
	(slightly limited)		(very limited)		(limited)		(limited)		(limited)	
	percs slowly	0.25			large stones	0.63			small stones	0.59
	(slightly limited)				(limited)				(moderately limited)	
73090:										
Useful	Very limited:		Very limited:		Very limited:		Moderately limited:		Moderately limited:	
	wetness	1.00	wetness	1.00	depth to bedrock	1.00	wetness	0.44	too clayey	0.45
	(very limited)		(very limited)		(very limited)		(moderately limited)		(moderately limited)	
	percs slowly	0.71	slope	0.91	too clayey	0.70	depth to bedrock	0.10	wetness	0.35
	(limited)		(limited)		(limited)		(slightly limited)		(moderately limited)	
	depth to bedrock	0.35	seepage	0.50	wetness	0.69			too acid	0.12
	(moderately limited)		(moderately limited)		(limited)				(slightly limited)	
73091:										
Useful	Very limited:		Very limited:		Very limited:		Limited:		Limited:	
	wetness	1.00	slope	1.00	depth to bedrock	1.00	slope	0.63	slope	0.63
	(very limited)		(very limited)		(very limited)		(limited)		(limited)	
	percs slowly	0.71	wetness	1.00	too clayey	0.70	wetness	0.44	too clayey	0.45
	(limited)		(very limited)		(limited)		(moderately limited)		(moderately limited)	
	slope	0.63	seepage	0.50	wetness	0.69	depth to bedrock	0.10	wetness	0.35
	(limited)		(moderately limited)		(limited)		(slightly limited)		(moderately limited)	
73092:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	depth to bedrock	1.00	wetness	1.00	depth to bedrock	1.00	depth to bedrock	1.00	depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	depth to bedrock	1.00	too clayey	1.00	wetness	0.69	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	percs slowly	0.94	slope	1.00	wetness	0.89			hard to pack	0.70
	(limited)		(very limited)		(limited)				(limited)	
73093:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	depth to bedrock	1.00	slope	1.00	depth to bedrock	1.00	depth to bedrock	1.00	depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	wetness	1.00	too clayey	1.00	wetness	0.69	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	percs slowly	0.94	depth to bedrock	1.00	wetness	0.89	slope	0.63	hard to pack	0.70
	(limited)		(very limited)		(limited)		(limited)		(limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73094:										
Gatewood	Very limited: depth to bedrock (very limited) slope (very limited) wetness (very limited)	1.00 1.00 1.00	Very limited: slope (very limited) wetness (very limited) depth to bedrock (very limited)	1.00 1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited) too clayey (very limited)	1.00 1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited) wetness (limited)	1.00 1.00 0.69	Very limited: depth to bedrock (very limited) slope (very limited) too clayey (very limited)	1.00 1.00 1.00
73095:										
Gravois	Very limited: slope (very limited) wetness (very limited) percs slowly (limited)	1.00 1.00 0.73	Very limited: slope (very limited) wetness (very limited)	1.00 1.00	Very limited: slope (very limited) wetness (very limited) too clayey (very limited)	1.00 1.00 1.00	Very limited: slope (very limited) wetness (limited)	1.00 0.93	Very limited: slope (very limited) too clayey (very limited) wetness (moderately limited)	1.00 1.00 0.57
73097:										
Swiss	Very limited: slope (very limited) wetness (very limited) percs slowly (very limited)	1.00 1.00 1.00	Very limited: slope (very limited) wetness (very limited)	1.00 1.00	Very limited: slope (very limited) too clayey (limited) wetness (limited)	1.00 0.90 0.69	Very limited: slope (very limited) wetness (moderately limited)	1.00 0.44	Very limited: slope (very limited) too clayey (limited) hard to pack (limited)	1.00 0.79 0.70
73098:										
Plato	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) seepage (moderately limited)	1.00 0.50	Very limited: wetness (very limited) too clayey (very limited) too acid (limited)	1.00 1.00 0.60	Very limited: wetness (very limited)	1.00	Very limited: too clayey (very limited) wetness (limited) too acid (limited)	1.00 0.94 0.60
73106:										
Mariosa	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (limited) too acid (slightly limited)	1.00 0.74 0.18	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (moderately limited) too acid (slightly limited)	1.00 0.51 0.18

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73108:										
Gravois	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.73	Very limited: wetness (very limited) slope (limited)	1.00 0.91	Very limited: wetness (very limited) too clayey (very limited) too acid (slightly limited)	1.00 1.00 0.18	Limited: wetness (limited)	0.93	Very limited: too clayey (very limited) wetness (moderately limited) too acid (slightly limited)	1.00 0.57 0.18
Gatewood	Very limited: depth to bedrock (very limited) wetness (very limited) percs slowly (limited)	1.00 1.00 0.94	Very limited: wetness (very limited) depth to bedrock (very limited) slope (limited)	1.00 1.00 0.91	Very limited: depth to bedrock (very limited) too clayey (very limited) wetness (limited)	1.00 1.00 0.89	Very limited: depth to bedrock (very limited) wetness (limited)	1.00 0.69	Very limited: depth to bedrock (very limited) too clayey (very limited) hard to pack (limited)	1.00 1.00 0.70
73109:										
Alred	Very limited: slope (very limited)	1.00	Very limited: slope (very limited) seepage (moderately limited)	1.00 0.50	Very limited: slope (very limited) too clayey (limited) too acid (moderately limited)	1.00 0.90 0.36	Very limited: slope (very limited)	1.00	Very limited: slope (very limited) small stones >35% (very limited) too clayey (limited)	1.00 1.00 0.79
73112:										
Gunlock	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.71	Very limited: wetness (very limited) slope (limited)	1.00 0.91	Very limited: wetness (very limited) too clayey (very limited)	1.00 1.00	Limited: wetness (limited)	0.96	Very limited: too clayey (very limited) wetness (moderately limited)	1.00 0.59
73135:										
Union	Very limited: wetness (very limited) percs slowly (slightly limited)	1.00 0.25	Very limited: wetness (very limited) slope (limited) seepage (moderately limited)	1.00 0.91 0.50	Very limited: wetness (very limited) too clayey (very limited) too acid (slightly limited)	1.00 1.00 0.30	Limited: wetness (limited)	0.96	Very limited: too clayey (very limited) wetness (moderately limited) too acid (slightly limited)	1.00 0.59 0.30

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73136:										
Union	Very limited: wetness (very limited) percs slowly (slightly limited)	1.00 0.25	Very limited: wetness (very limited) seepage (moderately limited)	1.00 0.50	Very limited: wetness (very limited) too clayey (very limited) too acid (slightly limited)	1.00 1.00 0.30	Limited: wetness (limited)	0.96	Very limited: too clayey (very limited) wetness (moderately limited) too acid (slightly limited)	1.00 0.59 0.30
73158:										
Cotton	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.93	Very limited: wetness (very limited) slope (very limited)	1.00 1.00	Very limited: wetness (very limited) too clayey (limited) too acid (slightly limited)	1.00 0.85 0.30	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (limited) too acid (slightly limited)	1.00 0.69 0.30
73165:										
Knobby	Very limited: depth to bedrock (very limited) slope (very limited) large stones (slightly limited)	1.00 1.00 0.03	Very limited: slope (very limited) depth to bedrock (very limited)	1.00 1.00	Very limited: slope (very limited) depth to bedrock (very limited)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited) small stones >35% (very limited)	1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Very limited: depth to bedrock (very limited) slope (very limited) percs slowly (slightly limited)	1.00 1.00 0.25	Very limited: slope (very limited) depth to bedrock (very limited) seepage (moderately limited)	1.00 1.00 0.50	Very limited: slope (very limited) depth to bedrock (very limited) too clayey (very limited)	1.00 1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited) too clayey (very limited)	1.00 1.00 1.00
73168:										
Swiss	Very limited: wetness (very limited) percs slowly (very limited) slope (slightly limited)	1.00 1.00 0.16	Very limited: wetness (very limited) slope (very limited)	1.00 1.00	Limited: too clayey (limited) wetness (limited) too acid (moderately limited)	0.90 0.69 0.42	Moderately limited: wetness (moderately limited) slope (slightly limited)	0.44 0.16	Limited: too clayey (limited) hard to pack (limited) too acid (moderately limited)	0.79 0.70 0.42

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73192:										
Beemont	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	wetness	1.00	wetness	1.00	depth to bedrock	1.00	seepage	0.75	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	percs slowly	1.00	seepage	1.00	too clayey	1.00	wetness	0.60	hard to pack	0.70
	(very limited)		(very limited)		(very limited)		(limited)		(limited)	
	depth to bedrock	0.50	slope	0.91	wetness	0.79	depth to bedrock	0.36	wetness	0.40
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
73193:										
Beemont	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	wetness	1.00	slope	1.00	depth to bedrock	1.00	seepage	0.75	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	percs slowly	1.00	wetness	1.00	too clayey	1.00	slope	0.63	hard to pack	0.70
	(very limited)		(very limited)		(very limited)		(limited)		(limited)	
	slope	0.63	seepage	1.00	wetness	0.79	wetness	0.60	slope	0.63
	(limited)		(very limited)		(limited)		(limited)		(limited)	
73194:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	slope	1.00	depth to bedrock	1.00	slope	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	1.00	wetness	1.00	slope	1.00	seepage	0.75	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	slope	1.00	seepage	1.00	too clayey	1.00	wetness	0.60	hard to pack	0.70
	(very limited)		(very limited)		(very limited)		(limited)		(limited)	
73195:										
Useful	Very limited:		Very limited:		Very limited:		Moderately limited:		Moderately limited:	
	wetness	1.00	wetness	1.00	depth to bedrock	1.00	wetness	0.44	too clayey	0.45
	(very limited)		(very limited)		(very limited)		(moderately limited)		(moderately limited)	
	percs slowly	0.71	slope	0.91	too clayey	0.70	depth to bedrock	0.10	wetness	0.35
	(limited)		(limited)		(limited)		(slightly limited)		(moderately limited)	
	depth to bedrock	0.35	seepage	0.50	wetness	0.69			too acid	0.12
	(moderately limited)		(moderately limited)		(limited)				(slightly limited)	
Moko	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	depth to bedrock	1.00	depth to bedrock	1.00	depth to bedrock	1.00	depth to bedrock	1.00	depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			slope	0.91						
			(limited)							

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73196:										
Mariosa	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (limited) too acid (moderately limited)	1.00 0.75 0.42	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (moderately limited) too acid (moderately limited)	1.00 0.53 0.42
74633:										
Hartville	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.93	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (moderately limited) too acid (slightly limited)	1.00 0.36 0.06	Limited: wetness (limited)	0.99	Limited: hard to pack (limited) wetness (moderately limited) too clayey (slightly limited)	0.70 0.60 0.18
74634:										
Hartville	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.93	Very limited: wetness (very limited) slope (limited)	1.00 0.91	Very limited: wetness (very limited) too clayey (moderately limited) too acid (slightly limited)	1.00 0.36 0.06	Limited: wetness (limited)	0.99	Limited: hard to pack (limited) wetness (moderately limited) too clayey (slightly limited)	0.70 0.60 0.18
74656:										
Deible	Very limited: wetness (very limited) flooding (rare) (moderately limited)	1.00 0.60	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited) too clayey (limited) flooding (rare) (moderately limited)	1.00 0.74 0.60	Very limited: wetness (very limited) flooding (rare) (moderately limited)	1.00 0.60	Very limited: wetness (very limited) hard to pack (limited) too clayey (moderately limited)	1.00 0.70 0.51
75376:										
Cedargap	Very limited: flooding (very limited) percs slowly (limited) wetness (moderately limited)	1.00 0.71 0.60	Very limited: flooding (very limited) wetness (limited) seepage (moderately limited)	1.00 0.71 0.50	Very limited: flooding (very limited) too clayey (limited) wetness (slightly limited)	1.00 0.78 0.30	Very limited: flooding (very limited)	1.00	Limited: small stones (limited) too clayey (moderately limited)	0.99 0.57

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75389:										
Hacreek	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.71			flooding (rare)	0.60	flooding (rare)	0.60	too clayey	0.15
	(limited)				(moderately limited)		(moderately limited)		(slightly limited)	
	flooding (rare)	0.60			too clayey	0.31				
	(moderately limited)				(moderately limited)					
75395:										
Jamesfin	Very limited:		Very limited:		Very limited:		Very limited:		Not limited	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
	wetness	0.30	seepage	0.50	wetness	0.15				
	(moderately limited)		(moderately limited)		(slightly limited)					
	percs slowly	0.25								
	(slightly limited)									
75398:										
Kaintuck	Very limited:		Very limited:		Very limited:		Very limited:		Moderately limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	seepage	0.50
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
			seepage	1.00	seepage	0.79	seepage	0.75		
			(very limited)		(limited)		(limited)			
75399:										
Jamesfin	Very limited:		Very limited:		Very limited:		Very limited:		Not limited	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
	wetness	0.30	seepage	0.50	wetness	0.15				
	(moderately limited)		(moderately limited)		(slightly limited)					
	percs slowly	0.25								
	(slightly limited)									
75400:										
Gladden	Very limited:		Very limited:		Very limited:		Very limited:		Slightly limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	small stones	0.22
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	percs slowly	0.25	seepage	1.00	seepage	0.79	seepage	0.75		
	(slightly limited)		(very limited)		(limited)		(limited)			

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75408:										
Secesh	Moderately limited: flooding (rare) (moderately limited)	0.60	Moderately limited: seepage (moderately limited)	0.50	Moderately limited: flooding (rare) (moderately limited)	0.60	Moderately limited: flooding (rare) (moderately limited)	0.60	Not limited	
	percs slowly (slightly limited)	0.25			too clayey (slightly limited)	0.06				
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 14.--Construction Materials and Excavating

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Very limited: low strength (very limited) wetness (very limited) shrink-swell (slightly limited)	 1.00 1.00 0.17	Very limited: excess fines (thickest layer) excess fines (bottom layer)	 1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	 1.00 1.00	Very limited: wetness (very limited)	 1.00	Very limited: wetness (very limited) cutbanks cave (slightly limited)	 1.00 0.29
64001:										
Freeburg	Very limited: low strength (very limited) wetness (limited) shrink-swell (moderately limited)	 1.00 0.71 0.39	Very limited: excess fines (thickest layer) excess fines (bottom layer)	 1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	 1.00 1.00	Limited: wetness (limited) too clayey (moderately limited)	 0.71 0.33	Very limited: wetness (very limited) cutbanks cave (slightly limited)	 1.00 0.29
66003:										
Jemerson	Very limited: low strength (very limited) shrink-swell (slightly limited)	 1.00 0.29	Very limited: excess fines (thickest layer) excess fines (bottom layer)	 1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	 1.00 1.00	Not limited		Very limited: cutbanks cave (very limited) wetness (moderately limited)	 1.00 0.47
66005:										
Deible	Very limited: wetness (very limited) low strength (very limited)	 1.00 1.00	Very limited: excess fines (thickest layer) excess fines (bottom layer)	 1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	 1.00 1.00	Very limited: wetness (very limited)	 1.00	Very limited: wetness (very limited) too clayey (moderately limited) cutbanks cave (slightly limited)	 1.00 0.51 0.29

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70028:										
Moko	Very limited: depth to bedrock (very limited)	1.00	Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Limited: excess fines (bottom layer); excess fines (thickest layer)	1.00; 0.75	Very limited: depth to bedrock (very limited); small stones (very limited); large surface stones (limited)	1.00; 1.00; 0.79	Very limited: hard bedrock <40" (very limited); cutbanks cave (slightly limited); slope (slightly limited)	1.00; 0.29; 0.04
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
70029:										
Moko	Very limited: depth to bedrock (very limited); slope (very limited)	1.00; 1.00	Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Very limited: excess fines (bottom layer); excess fines (thickest layer)	1.00; 1.00	Very limited: depth to bedrock (very limited); slope (very limited); large surface stones (limited)	1.00; 1.00; 0.79	Very limited: hard bedrock <40" (very limited); slope (very limited); cutbanks cave (slightly limited)	1.00; 1.00; 0.29
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Very limited: low strength (very limited); wetness (limited); shrink-swell (slightly limited)	1.00; 0.76; 0.27	Very limited: excess fines (thickest layer); excess fines (bottom layer); small stones (bottom layer)	1.00; 1.00; 1.00	Very limited: excess fines (thickest layer); excess fines (bottom layer); small stones (bottom layer)	1.00; 1.00; 1.00	Limited: wetness (limited); too clayey (moderately limited); too acid (slightly limited)	0.76; 0.48; 0.18	Very limited: cutbanks cave (very limited); wetness (very limited); too clayey (very limited)	1.00; 1.00; 1.00
73035:										
Gravois	Very limited: low strength (very limited); wetness (limited); shrink-swell (slightly limited)	1.00; 0.76; 0.27	Very limited: excess fines (thickest layer); excess fines (bottom layer); small stones (bottom layer)	1.00; 1.00; 1.00	Very limited: excess fines (thickest layer); excess fines (bottom layer); small stones (bottom layer)	1.00; 1.00; 1.00	Limited: wetness (limited); too clayey (moderately limited); slope (moderately limited)	0.76; 0.48; 0.37	Very limited: cutbanks cave (very limited); wetness (very limited); too clayey (very limited)	1.00; 1.00; 1.00

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73088:										
Rueter	Slightly limited:		Very limited:		Limited:		Very limited:		Limited:	
	large stones (slightly limited)	0.29	excess fines (thickest layer)	1.00	excess fines (bottom layer)	0.99	small stones (very limited)	1.00	too clayey (limited)	0.83
	shrink-swell (slightly limited)	0.09	excess fines (bottom layer)	1.00	excess fines (thickest layer)	0.99	area reclaim (very limited)	1.00	slope (limited)	0.63
			small stones (thickest layer)	0.66	small stones (thickest layer)	0.66	large surface stones (limited)	0.79	cutbanks cave (slightly limited)	0.29
73089:										
Rueter	Limited:		Very limited:		Limited:		Very limited:		Very limited:	
	slope (limited)	0.92	excess fines (thickest layer)	1.00	excess fines (bottom layer)	0.99	slope (very limited)	1.00	slope (very limited)	1.00
	large stones (slightly limited)	0.29	excess fines (bottom layer)	1.00	excess fines (thickest layer)	0.99	small stones (very limited)	1.00	too clayey (limited)	0.83
	shrink-swell (slightly limited)	0.09	small stones (thickest layer)	0.66	small stones (thickest layer)	0.66	area reclaim (very limited)	1.00	cutbanks cave (slightly limited)	0.29
73090:										
Useful	Very limited:		Very limited:		Very limited:		Limited:		Limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	too clayey (limited)	0.99	wetness (limited)	0.99
	shrink-swell (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	too acid (slightly limited)	0.12	too clayey (moderately limited)	0.45
	depth to bedrock (slightly limited)	0.10					wetness (slightly limited)	0.03	depth to bedrock (moderately limited)	0.35
73091:										
Useful	Very limited:		Very limited:		Very limited:		Limited:		Limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	slope (limited)	0.63	wetness (limited)	0.99
	shrink-swell (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	too acid (slightly limited)	0.12	slope (limited)	0.63
	depth to bedrock (slightly limited)	0.10					wetness (slightly limited)	0.03	too clayey (moderately limited)	0.45
73092:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	depth to bedrock (very limited)	1.00	hard bedrock <40" (very limited)	1.00
	depth to bedrock (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	too clayey (very limited)	1.00	wetness (very limited)	1.00
	shrink-swell (very limited)	1.00					wetness (slightly limited)	0.26	too clayey (very limited)	1.00

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73093:										
Gatewood	Very limited: low strength (very limited) depth to bedrock (very limited) shrink-swell (very limited)	1.00 1.00 1.00	Very limited: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	1.00 1.00	Very limited: depth to bedrock (very limited) too clayey (very limited) slope (limited)	1.00 1.00 0.63	Very limited: hard bedrock <40" (very limited) wetness (very limited) too clayey (very limited)	1.00 1.00 1.00
73094:										
Gatewood	Very limited: low strength (very limited) depth to bedrock (very limited) shrink-swell (very limited)	1.00 1.00 1.00	Very limited: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited) too clayey (very limited)	1.00 1.00 1.00	Very limited: hard bedrock <40" (very limited) slope (very limited) wetness (very limited)	1.00 1.00 1.00
73095:										
Gravois	Very limited: low strength (very limited) wetness (limited) shrink-swell (slightly limited)	1.00 0.76 0.27	Very limited: excess fines (thickest layer) excess fines (bottom layer) small stones (bottom layer)	1.00 1.00 1.00	Very limited: excess fines (thickest layer) excess fines (bottom layer) small stones (bottom layer)	1.00 1.00 1.00	Very limited: slope (very limited) wetness (limited) too clayey (moderately limited)	1.00 0.76 0.42	Very limited: slope (very limited) cutbanks cave (very limited) wetness (very limited)	1.00 1.00 1.00
73097:										
Swiss	Very limited: low strength (very limited) shrink-swell (very limited) slope (limited)	1.00 1.00 0.92	Very limited: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	1.00 1.00	Very limited: slope (very limited) too clayey (very limited) dense layer (moderately limited)	1.00 1.00 0.46	Very limited: slope (very limited) wetness (limited) too clayey (limited)	1.00 0.99 0.79
73098:										
Plato	Very limited: low strength (very limited) shrink-swell (very limited) wetness (very limited)	1.00 1.00 0.99	Very limited: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Very limited: excess fines (bottom layer) excess fines (thickest layer)	1.00 1.00	Very limited: too clayey (very limited) dense layer <20" (very limited) wetness (very limited)	1.00 1.00 0.99	Very limited: wetness (very limited) cutbanks cave (very limited) too clayey (very limited)	1.00 1.00 1.00

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73106:										
Mariosa	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00	wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	low strength	1.00	excess fines	1.00	excess fines	1.00			too clayey	0.51
	(very limited)		(bottom layer)		(thickest layer)				(moderately limited)	
									cutbanks cave	0.29
									(slightly limited)	
73108:										
Gravois	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	wetness	0.76	cutbanks cave	1.00
	(very limited)		(thickest layer)		(thickest layer)		(limited)		(very limited)	
	wetness	0.76	excess fines	1.00	excess fines	1.00	too clayey	0.48	wetness	1.00
	(limited)		(bottom layer)		(bottom layer)		(moderately limited)		(very limited)	
	shrink-swell	0.27	small stones	1.00	small stones	1.00	too acid	0.18	too clayey	1.00
	(slightly limited)		(bottom layer)		(bottom layer)		(slightly limited)		(very limited)	
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	depth to bedrock	1.00	hard bedrock <40"	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	depth to bedrock	1.00	excess fines	1.00	excess fines	1.00	too clayey	1.00	wetness	1.00
	(very limited)		(bottom layer)		(thickest layer)		(very limited)		(very limited)	
	shrink-swell	1.00					wetness	0.26	too clayey	1.00
	(very limited)						(slightly limited)		(very limited)	
73109:										
Alred	Limited:		Very limited:		Limited:		Very limited:		Very limited:	
	slope	0.92	excess fines	1.00	excess fines	1.00	slope	1.00	slope	1.00
	(limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
			excess fines	1.00	excess fines	0.75	small stones	1.00	cutbanks cave	1.00
			(bottom layer)		(thickest layer)		(very limited)		(very limited)	
							too acid	0.42	too clayey	0.79
							(moderately limited)		(limited)	
73112:										
Gunlock	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	wetness	0.82	cutbanks cave	1.00
	(very limited)		(thickest layer)		(bottom layer)		(limited)		(very limited)	
	wetness	0.82	excess fines	1.00	excess fines	1.00	too clayey	0.77	wetness	1.00
	(limited)		(bottom layer)		(thickest layer)		(limited)		(very limited)	
	shrink-swell	0.45							too clayey	1.00
	(moderately limited)								(very limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73135:										
Union	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	too clayey (limited)	0.90	cutbanks cave (very limited)	1.00
	wetness (limited)	0.82	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	dense layer (limited)	0.86	wetness (very limited)	1.00
	shrink-swell (moderately limited)	0.45					wetness (limited)	0.82	too clayey (very limited)	1.00
73136:										
Union	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	too clayey (limited)	0.94	cutbanks cave (very limited)	1.00
	wetness (limited)	0.82	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	dense layer (limited)	0.86	wetness (very limited)	1.00
	shrink-swell (moderately limited)	0.45					wetness (limited)	0.82	too clayey (very limited)	1.00
73158:										
Cotton	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	wetness (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	too clayey (very limited)	1.00	cutbanks cave (very limited)	1.00
	shrink-swell (very limited)	1.00					too acid (slightly limited)	0.30	too clayey (limited)	0.69
73165:										
Knobby	Very limited:		Very limited:		Possible:		Very limited:		Very limited:	
	slope (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	depth to bedrock (very limited)	1.00	hard bedrock <40" (very limited)	1.00
	depth to bedrock (very limited)	1.00	excess fines (bottom layer)	1.00	possible source (thickest layer)	0.42	slope (very limited)	1.00	slope (very limited)	1.00
	large stones (slightly limited)	0.03					small stones (very limited)	1.00	cutbanks cave (slightly limited)	0.29
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	depth to bedrock (very limited)	1.00	hard bedrock <40" (very limited)	1.00
	low strength (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	depth to bedrock (very limited)	1.00					too clayey (very limited)	1.00	too clayey (very limited)	1.00

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73168:										
Swiss	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	too clayey	1.00	wetness	0.99
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(limited)	
	shrink-swell	1.00	excess fines	1.00	excess fines	1.00	dense layer	0.46	too clayey	0.79
	(very limited)		(bottom layer)		(thickest layer)		(moderately limited)		(limited)	
	wetness	0.03					too acid	0.42	dense layer	0.46
	(slightly limited)						(moderately limited)		(moderately limited)	
73192:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	too clayey	1.00	cutbanks cave	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	shrink-swell	1.00	excess fines	1.00	excess fines	1.00	too acid	0.36	too clayey	1.00
	(limited)		(bottom layer)		(thickest layer)		(moderately limited)		(very limited)	
	depth to bedrock	0.36					large surface stones	0.13	wetness	1.00
	(moderately limited)						(slightly limited)		(very limited)	
73193:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	too clayey	1.00	cutbanks cave	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	shrink-swell	1.00	excess fines	1.00	excess fines	1.00	slope	0.63	too clayey	1.00
	(limited)		(bottom layer)		(thickest layer)		(limited)		(very limited)	
	depth to bedrock	0.36					too acid	0.36	wetness	1.00
	(moderately limited)						(moderately limited)		(very limited)	
73194:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	too clayey	1.00	cutbanks cave	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	shrink-swell	1.00	excess fines	1.00	excess fines	1.00	slope	1.00	slope	1.00
	(limited)		(bottom layer)		(thickest layer)		(very limited)		(very limited)	
	slope	0.92					too acid	0.36	too clayey	1.00
	(limited)						(moderately limited)		(very limited)	
73195:										
Useful	Very limited:		Very limited:		Very limited:		Slightly limited:		Limited:	
	low strength	1.00	excess fines	1.00	excess fines	1.00	too acid	0.12	wetness	0.99
	(very limited)		(thickest layer)		(bottom layer)		(slightly limited)		(limited)	
	shrink-swell	1.00	excess fines	1.00	excess fines	1.00	wetness	0.03	too clayey	0.45
	(very limited)		(bottom layer)		(thickest layer)		(slightly limited)		(moderately limited)	
	depth to bedrock	0.10							depth to bedrock	0.35
	(slightly limited)								(moderately limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73195:										
Moko	Very limited: depth to bedrock (very limited)	1.00	Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Very limited: excess fines (bottom layer); excess fines (thickest layer)	1.00; 1.00	Very limited: depth to bedrock (very limited); large surface stones (slightly limited)	1.00; 0.13	Very limited: hard bedrock <40" (very limited); cutbanks cave (slightly limited)	1.00; 0.29
73196:										
Mariosa	Very limited: low strength (very limited); wetness (very limited); shrink-swell (very limited)	1.00; 1.00; 1.00	Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Very limited: excess fines (bottom layer); excess fines (thickest layer)	1.00; 1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited); too clayey (moderately limited); cutbanks cave (slightly limited)	1.00; 0.53; 0.29
74633, 74634:										
Hartville	Very limited: low strength (very limited); shrink-swell (very limited); wetness (limited)	1.00; 1.00; 0.86	Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Very limited: excess fines (bottom layer); excess fines (thickest layer)	1.00; 1.00	Limited: wetness (limited); too clayey (limited); too acid (slightly limited)	0.86; 0.83; 0.06	Very limited: wetness (very limited); cutbanks cave (slightly limited); too clayey (slightly limited)	1.00; 0.29; 0.18
74656:										
Deible	Very limited: wetness (very limited); low strength (limited)	1.00; 0.78	Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Very limited: excess fines (bottom layer); excess fines (thickest layer)	1.00; 1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited); too clayey (moderately limited); cutbanks cave (slightly limited)	1.00; 0.51; 0.29
75376:										
Cedargap	Not limited		Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Possible: excess fines (bottom layer); possible source (thickest layer)	1.00; 0.50	Very limited: small stones (very limited); too sandy (moderately limited); too clayey (moderately limited)	1.00; 0.34; 0.33	Very limited: cutbanks cave (very limited); wetness (limited); flooding (moderately limited)	1.00; 0.61; 0.60

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75389:										
Hacreek	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	wetness (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00	too clayey (limited)	0.78	cutbanks cave (slightly limited)	0.29
	shrink-swell (moderately limited)	0.45							too clayey (slightly limited)	0.15
75395:										
Jamesfin	Very limited:		Very limited:		Very limited:		Not limited		Moderately limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00			flooding (moderately limited)	0.60
			excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00			cutbanks cave (slightly limited)	0.29
									wetness (slightly limited)	0.16
75398:										
Kaintuck	Not limited		Very limited:		Very limited:		Limited:		Very limited:	
			excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00	too sandy (limited)	0.76	cutbanks cave (very limited)	1.00
			excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00			flooding (moderately limited)	0.60
75399:										
Jamesfin	Very limited:		Very limited:		Very limited:		Not limited		Moderately limited:	
	low strength (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (bottom layer)	1.00			flooding (moderately limited)	0.60
			excess fines (bottom layer)	1.00	excess fines (thickest layer)	1.00			cutbanks cave (slightly limited)	0.29
									wetness (slightly limited)	0.16
75400:										
Gladden	Not limited		Possible:		Possible:		Very limited:		Very limited:	
			excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	area reclaim (very limited)	1.00	cutbanks cave (very limited)	1.00
			possible source (bottom layer)	0.14	possible source (bottom layer)	0.25			flooding (moderately limited)	0.60

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75408:										
Secesh	Slightly limited: shrink-swell (slightly limited)	0.01	Very limited: excess fines (thickest layer); excess fines (bottom layer)	1.00; 1.00	Very limited: excess fines (bottom layer); excess fines (thickest layer)	1.00; 1.00	Limited: small stones (limited); too clayey (slightly limited); area reclaim (slightly limited)	0.88; 0.13; 0.08	Very limited: cutbanks cave (very limited)	1.00
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 15.--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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Not limited		Moderately limited: percs slowly (moderately limited)	0.39	Moderately limited: percs slowly (moderately limited)	0.39	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
64001:										
Freeburg	Not limited		Slightly limited: percs slowly (slightly limited)	0.13	Slightly limited: percs slowly (slightly limited)	0.13	Moderately limited: wetness (moderately limited)	0.53	Moderately limited: wetness (moderately limited)	0.53
66003:										
Jemerson	Moderately limited: seepage (moderately limited)	0.50	Not limited		Not limited		Not limited		Not limited	
66005:										
Deible	Not limited		Not limited		Slightly limited: droughty (slightly limited)	0.20	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
									droughty (slightly limited)	0.20
70028:										
Moko	Very limited: bedrock <20 in. (very limited)	1.00	Very limited: shallow to bedrock (very limited)	1.00	Very limited: shallow to bedrock (very limited)	1.00	Very limited: depth to bedrock (very limited)	1.00	Very limited: bedrock <20 in. (very limited)	1.00
	slope (limited)	0.70	slope (very limited)	1.00	droughty (very limited)	1.00	large surface stones (limited)	0.79	droughty (very limited)	1.00
			large surface stones (limited)	0.79	slope (very limited)	1.00	slope (limited)	0.70	large surface stones (limited)	0.79
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70029:										
Moko	Very limited: bedrock <20 in. (very limited) slope (very limited)	1.00 1.00	Very limited: slope (very limited) shallow to bedrock (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: shallow to bedrock (very limited) droughty (very limited) slope (very limited)	1.00 1.00 1.00	Very limited: slope (very limited) depth to bedrock (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: bedrock <20 in. (very limited) slope (very limited) droughty (very limited)	1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Moderately limited: slope (moderately limited)	0.30	Limited: slope (limited) percs slowly (moderately limited)	0.98 0.39	Limited: slope (limited) percs slowly (moderately limited)	0.98 0.39	Moderately limited: wetness (moderately limited) slope (moderately limited)	0.55 0.30	Moderately limited: wetness (moderately limited) slope (moderately limited)	0.55 0.30
73035:										
Gravois	Limited: slope (limited)	0.89	Very limited: slope (very limited) percs slowly (moderately limited)	1.00 0.39	Very limited: slope (very limited) percs slowly (moderately limited)	1.00 0.39	Limited: slope (limited) wetness (moderately limited)	0.89 0.55	Limited: slope (limited) wetness (moderately limited)	0.89 0.55
73088:										
Rueter	Very limited: seepage (very limited) slope (limited)	1.00 0.99	Very limited: slope (very limited) large stones (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: slope (very limited) large surface stones (limited) droughty (moderately limited)	1.00 0.79 0.43	Very limited: large stones (very limited) slope (limited) large surface stones (limited)	1.00 0.99 0.79	Very limited: large stones (very limited) slope (limited) large surface stones (limited)	1.00 0.99 0.79
73089:										
Rueter	Very limited: slope (very limited) seepage (very limited)	1.00 1.00	Very limited: slope (very limited) large stones (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: slope (very limited) large surface stones (limited) droughty (moderately limited)	1.00 0.79 0.43	Very limited: slope (very limited) large stones (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: slope (very limited) large stones (very limited) large surface stones (limited)	1.00 1.00 0.79

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73090:										
Useful	Moderately limited:		Limited:		Limited:		Moderately limited:		Moderately limited:	
	seepage	0.50	slope	0.98	slope	0.98	slope	0.30	depth to bedrock	0.34
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
	depth to bedrock	0.34	percs slowly	0.13	percs slowly	0.13	wetness	0.13	slope	0.30
	(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	slope	0.30					depth to bedrock	0.10	wetness	0.13
	(moderately limited)						(slightly limited)		(slightly limited)	
73091:										
Useful	Limited:		Very limited:		Very limited:		Limited:		Limited:	
	slope	0.99	slope	1.00	slope	1.00	slope	0.99	slope	0.99
	(limited)		(very limited)		(very limited)		(limited)		(limited)	
	seepage	0.50	percs slowly	0.13	percs slowly	0.13	wetness	0.13	depth to bedrock	0.34
	(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	depth to bedrock	0.34					depth to bedrock	0.10	wetness	0.13
	(moderately limited)						(slightly limited)		(slightly limited)	
73092:										
Gatewood	Limited:		Very limited:		Very limited:		Very limited:		Limited:	
	depth to bedrock	0.88	slope	1.00	slope	1.00	depth to bedrock	1.00	depth to bedrock	0.88
	(limited)		(very limited)		(very limited)		(very limited)		(limited)	
	slope	0.45	depth to bedrock	0.42	depth to bedrock	0.42	slope	0.45	slope	0.45
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
			percs slowly	0.40	percs slowly	0.40	wetness	0.36	wetness	0.36
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
73093:										
Gatewood	Limited:		Very limited:		Very limited:		Very limited:		Limited:	
	slope	0.99	slope	1.00	slope	1.00	depth to bedrock	1.00	slope	0.99
	(limited)		(very limited)		(very limited)		(very limited)		(limited)	
	depth to bedrock	0.88	depth to bedrock	0.42	depth to bedrock	0.42	slope	0.99	depth to bedrock	0.88
	(limited)		(moderately limited)		(moderately limited)		(limited)		(limited)	
			percs slowly	0.40	percs slowly	0.40	wetness	0.36	wetness	0.36
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
73094:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	1.00	slope	1.00	slope	1.00	slope	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	depth to bedrock	0.88	depth to bedrock	0.42	depth to bedrock	0.42	depth to bedrock	1.00	depth to bedrock	0.88
	(limited)		(moderately limited)		(moderately limited)		(very limited)		(limited)	
			percs slowly	0.40	percs slowly	0.40	wetness	0.36	wetness	0.36
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73095:										
Gravois	Very limited: slope (very limited)	1.00	Very limited: slope (very limited); percs slowly (moderately limited)	1.00; 0.39	Very limited: slope (very limited); percs slowly (moderately limited)	1.00; 0.39	Very limited: slope (very limited); wetness (moderately limited)	1.00; 0.55	Very limited: slope (very limited); wetness (moderately limited)	1.00; 0.55
73097:										
Swiss	Very limited: slope (very limited)	1.00	Very limited: slope (very limited); percs slowly (very limited); large surface stones (slightly limited)	1.00; 1.00; 0.13	Very limited: slope (very limited); percs slowly (very limited); large surface stones (slightly limited)	1.00; 1.00; 0.13	Very limited: slope (very limited); large surface stones (slightly limited); wetness (slightly limited)	1.00; 0.13; 0.13	Very limited: slope (very limited); large surface stones (slightly limited); wetness (slightly limited)	1.00; 0.13; 0.13
73098:										
Plato	Moderately limited: seepage (moderately limited)	0.50	Slightly limited: percs slowly (slightly limited)	0.13	Slightly limited: droughty (slightly limited); percs slowly (slightly limited)	0.24; 0.13	Limited: wetness (limited)	0.94	Limited: wetness (limited); rooting depth (limited); droughty (slightly limited)	0.94; 0.80; 0.24
73106:										
Mariosa	Not limited		Moderately limited: percs slowly (moderately limited)	0.39	Limited: droughty (limited); percs slowly (moderately limited)	0.94; 0.39	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited); droughty (limited)	1.00; 0.94
73108:										
Gravois	Moderately limited: slope (moderately limited)	0.30	Limited: slope (limited); percs slowly (moderately limited)	0.98; 0.39	Limited: slope (limited); percs slowly (moderately limited)	0.98; 0.39	Moderately limited: wetness (moderately limited); slope (moderately limited)	0.55; 0.30	Moderately limited: wetness (moderately limited); slope (moderately limited)	0.55; 0.30
Gatewood	Limited: depth to bedrock (limited); slope (moderately limited)	0.88; 0.30	Limited: slope (limited); depth to bedrock (moderately limited); percs slowly (moderately limited)	0.98; 0.42; 0.40	Limited: slope (limited); depth to bedrock (moderately limited); percs slowly (moderately limited)	0.98; 0.42; 0.40	Very limited: depth to bedrock (very limited); wetness (moderately limited); slope (moderately limited)	1.00; 0.36; 0.30	Limited: depth to bedrock (limited); wetness (moderately limited); slope (moderately limited)	0.88; 0.36; 0.30

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73109:										
Alred	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	1.00	slope	1.00	slope	1.00	slope	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	seepage	0.50	large surface stones	0.13	droughty	1.00	large surface stones	0.13	droughty	1.00
	(moderately limited)		(slightly limited)		(very limited)		(slightly limited)		(very limited)	
					large surface stones	0.13			large surface stones	0.13
					(slightly limited)				(slightly limited)	
73112:										
Gunlock	Moderately limited:		Limited:		Limited:		Moderately limited:		Moderately limited:	
	slope	0.30	slope	0.98	slope	0.98	wetness	0.58	wetness	0.58
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
			percs slowly	0.13	percs slowly	0.13	slope	0.30	slope	0.30
			(slightly limited)		(slightly limited)		(moderately limited)		(moderately limited)	
73135:										
Union	Moderately limited:		Limited:		Limited:		Moderately limited:		Limited:	
	seepage	0.50	slope	0.98	slope	0.98	wetness	0.58	rooting depth	0.80
	(moderately limited)		(limited)		(limited)		(moderately limited)		(limited)	
	slope	0.30					slope	0.30	wetness	0.58
	(moderately limited)						(moderately limited)		(moderately limited)	
									slope	0.30
									(moderately limited)	
73136:										
Union	Moderately limited:		Not limited		Not limited		Moderately limited:		Limited:	
	seepage	0.50					wetness	0.58	rooting depth	0.80
	(moderately limited)						(moderately limited)		(limited)	
									wetness	0.58
									(moderately limited)	
73158:										
Cotton	Moderately limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	0.45	slope	1.00	slope	1.00	wetness	1.00	wetness	1.00
	(moderately limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			percs slowly	0.39	percs slowly	0.39	slope	0.45	slope	0.45
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73165:										
Knobby	Very limited: bedrock <20 in. (very limited) slope (very limited)	1.00 1.00	Very limited: slope (very limited) shallow to bedrock (very limited) large surface stones (very limited)	1.00 1.00 1.00	Very limited: shallow to bedrock (very limited) droughty (very limited) slope (very limited)	1.00 1.00 1.00	Very limited: slope (very limited) depth to bedrock (very limited) large stones (very limited)	1.00 1.00 1.00	Very limited: large stones (very limited) bedrock <20 in. (very limited) slope (very limited)	1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Very limited: slope (very limited) depth to bedrock (limited) seepage (moderately limited)	1.00 0.89 0.50	Very limited: slope (very limited) large surface stones (very limited) depth to bedrock (moderately limited)	1.00 1.00 0.46	Very limited: slope (very limited) large surface stones (very limited) droughty (limited)	1.00 1.00 0.66	Very limited: slope (very limited) depth to bedrock (very limited) large surface stones (very limited)	1.00 1.00 1.00	Very limited: slope (very limited) large surface stones (very limited) depth to bedrock (limited)	1.00 1.00 0.89
73168:										
Swiss	Limited: slope (limited)	0.80	Very limited: percs slowly (very limited) slope (very limited) large surface stones (slightly limited)	1.00 1.00 0.13	Very limited: percs slowly (very limited) slope (very limited) large surface stones (slightly limited)	1.00 1.00 0.13	Limited: slope (limited) large surface stones (slightly limited) wetness (slightly limited)	0.80 0.13 0.13	Limited: slope (limited) large surface stones (slightly limited)	0.80 0.13
73192:										
Beemont	Very limited: seepage (very limited) depth to bedrock (moderately limited) slope (moderately limited)	1.00 0.47 0.30	Very limited: percs slowly (very limited) slope (limited) large surface stones (slightly limited)	1.00 0.98 0.13	Very limited: percs slowly (very limited) slope (limited) large surface stones (slightly limited)	1.00 0.98 0.13	Moderately limited: depth to bedrock (moderately limited) slope (moderately limited) wetness (slightly limited)	0.36 0.30 0.28	Moderately limited: depth to bedrock (moderately limited) slope (moderately limited) wetness (slightly limited)	0.47 0.30 0.28
73193:										
Beemont	Very limited: seepage (very limited) slope (limited) depth to bedrock (moderately limited)	1.00 0.99 0.47	Very limited: slope (very limited) percs slowly (very limited) large surface stones (slightly limited)	1.00 1.00 0.13	Very limited: slope (very limited) percs slowly (very limited) large surface stones (slightly limited)	1.00 1.00 0.13	Limited: slope (limited) depth to bedrock (moderately limited) wetness (slightly limited)	0.99 0.36 0.28	Limited: slope (limited) depth to bedrock (moderately limited) wetness (slightly limited)	0.99 0.47 0.28

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73194:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	1.00	slope	1.00	slope	1.00	slope	1.00	slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	seepage	1.00	percs slowly	1.00	percs slowly	1.00	depth to bedrock	0.36	depth to bedrock	0.47
	(very limited)		(very limited)		(very limited)		(moderately limited)		(moderately limited)	
	depth to bedrock	0.47	large surface stones	0.13	large surface stones	0.13	wetness	0.28	wetness	0.28
	(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)	
73195:										
Useful	Moderately limited:		Limited:		Limited:		Moderately limited:		Moderately limited:	
	seepage	0.50	slope	0.98	slope	0.98	slope	0.30	depth to bedrock	0.34
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
	depth to bedrock	0.34	percs slowly	0.13	percs slowly	0.13	wetness	0.13	slope	0.30
	(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	slope	0.30					depth to bedrock	0.10	wetness	0.13
	(moderately limited)						(slightly limited)		(slightly limited)	
Moko	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	bedrock <20 in.	1.00	shallow to bedrock	1.00	shallow to bedrock	1.00	depth to bedrock	1.00	bedrock <20 in.	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	slope	0.30	slope	0.98	droughty	1.00	slope	0.30	droughty	1.00
	(moderately limited)		(limited)		(very limited)		(moderately limited)		(very limited)	
			percs slowly	0.57	slope	0.98	large surface stones	0.13	slope	0.30
			(moderately limited)		(limited)		(slightly limited)		(moderately limited)	
73196:										
Mariosa	Not limited		Very limited:		Very limited:		Very limited:		Very limited:	
			percs slowly	1.00	percs slowly	1.00	wetness	1.00	wetness	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
					droughty	0.95			droughty	0.95
					(limited)				(limited)	
74633:										
Hartville	Not limited		Moderately limited:		Moderately limited:		Moderately limited:		Moderately limited:	
			percs slowly	0.39	percs slowly	0.39	wetness	0.60	wetness	0.60
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
74634:										
Hartville	Moderately limited:		Limited:		Limited:		Moderately limited:		Moderately limited:	
	slope	0.30	slope	0.98	slope	0.98	wetness	0.60	wetness	0.60
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
			percs slowly	0.39	percs slowly	0.39	slope	0.30	slope	0.30
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
74656:										
Deible	Not limited		Not limited		Slightly limited: droughty (slightly limited)	0.20	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
									droughty (slightly limited)	0.20
75376:										
Cedargap	Moderately limited: seepage (moderately limited)	0.50	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Not limited		Not limited	
75389:										
Hacreek	Not limited		Slightly limited: percs slowly (slightly limited)	0.13	Slightly limited: percs slowly (slightly limited)	0.13	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
75395:										
Jamesfin	Moderately limited: seepage (moderately limited)	0.50	Moderately limited: flooding (moderately limited)	0.60	Moderately limited: flooding (moderately limited)	0.60	Not limited		Not limited	
75398:										
Kaintuck	Very limited: seepage (very limited)	1.00	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Not limited		Not limited	
75399:										
Jamesfin	Moderately limited: seepage (moderately limited)	0.50	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Not limited		Not limited	
75400:										
Gladden	Very limited: seepage (very limited)	1.00	Limited: cutbanks cave (limited	0.90	Limited: flooding (limited)	0.90	Not limited		Not limited	
			flooding (limited)	0.90						
75408:										
Secesh	Moderately limited: seepage (moderately limited)	0.50	Not limited		Not limited		Not limited		Not limited	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
99000: Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001: Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 16.--Waste 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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
64000:										
Racoon	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	wetness	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	flooding	0.30	flooding	0.30	flooding	0.30	flooding	0.30	too acid	0.01
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)	
64001:										
Freeburg	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	wetness	0.53	wetness	0.53	wetness	0.53	wetness	0.53	wetness	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
	flooding	0.30	flooding	0.30	flooding	0.30	flooding	0.30		
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)			
66003:										
Jemerson	Slightly limited:		Slightly limited:		Slightly limited:		Slightly limited:		Very limited:	
	flooding	0.30	flooding	0.30	flooding	0.30	flooding	0.30	percs slowly	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(very limited)	
									wetness	0.89
									(limited)	
66005:										
Deible	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	0.30	flooding	0.30	flooding	0.30	flooding	0.30	wetness	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(very limited)	
	droughty	0.20	droughty	0.20	droughty	0.20				
	(slightly limited)		(slightly limited)		(slightly limited)					

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70028:										
Moko	Very limited: shallow to bedrock (very limited) droughty (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: droughty (very limited) shallow to bedrock (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: droughty (very limited) shallow to bedrock (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: depth to bedrock (very limited) large surface stones (limited) slope (limited)	1.00 0.79 0.70	Very limited: percs slowly (very limited) depth to bedrock (very limited) slope (very limited)	1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
70029:										
Moko	Very limited: shallow to bedrock (very limited) droughty (very limited) slope (very limited)	1.00 1.00 1.00	Very limited: droughty (very limited) shallow to bedrock (very limited) slope (very limited)	1.00 1.00 1.00	Very limited: droughty (very limited) slope (very limited) shallow to bedrock (very limited)	1.00 1.00 1.00	Very limited: depth to bedrock (very limited) slope (very limited) large surface stones (limited)	1.00 1.00 0.79	Very limited: percs slowly (very limited) slope (very limited) depth to bedrock (very limited)	1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
73012:										
Gravois	Limited: percs slowly (limited) wetness (moderately limited)	0.60 0.55	Limited: percs slowly (limited) wetness (moderately limited)	0.60 0.55	Limited: percs slowly (limited) wetness (moderately limited) slope (moderately limited)	0.60 0.55 0.30	Limited: percs slowly (limited) wetness (moderately limited) slope (moderately limited)	0.60 0.55 0.30	Very limited: percs slowly (very limited) wetness (very limited) slope (limited)	1.00 1.00 0.91
73035:										
Gravois	Limited: slope (limited) percs slowly (limited) wetness (moderately limited)	0.68 0.60 0.55	Limited: slope (limited) percs slowly (limited) wetness (moderately limited)	0.68 0.60 0.55	Limited: slope (limited) percs slowly (limited) wetness (moderately limited)	0.89 0.60 0.55	Limited: slope (limited) percs slowly (limited) wetness (moderately limited)	0.89 0.60 0.55	Very limited: percs slowly (very limited) slope (very limited) wetness (very limited)	1.00 1.00 1.00

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73088:										
Rueter	Limited:		Limited:		Limited:		Limited:		Very limited:	
	too acid (limited)	0.84	too acid (limited)	0.84	slope (limited)	0.99	slope (limited)	0.99	slope (very limited)	1.00
	large surface stones (limited)	0.79	large surface stones (limited)	0.79	too acid (limited)	0.84	too acid (limited)	0.84	too cobbly (limited)	0.95
	slope (limited)	0.76	slope (limited)	0.76	large surface stones (limited)	0.79	large surface stones (limited)	0.79	large surface stones (limited)	0.79
73089:										
Rueter	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	too acid (limited)	0.84	too acid (limited)	0.84	too acid (limited)	0.84	too acid (limited)	0.84	too cobbly (limited)	0.95
	large surface stones (limited)	0.79	large surface stones (limited)	0.79	large surface stones (limited)	0.79	large surface stones (limited)	0.79	large surface stones (limited)	0.79
73090:										
Useful	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (very limited)	1.00
	wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	slope (moderately limited)	0.30	slope (moderately limited)	0.30	depth to bedrock (very limited)	1.00
					wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	wetness (very limited)	1.00
73091:										
Useful	Limited:		Limited:		Limited:		Limited:		Very limited:	
	slope (limited)	0.76	slope (limited)	0.76	slope (limited)	0.99	slope (limited)	0.99	percs slowly (very limited)	1.00
	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	slope (very limited)	1.00
	wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	depth to bedrock (very limited)	1.00
73092:										
Gatewood	Moderately limited:		Moderately limited:		Moderately limited:		Very limited:		Very limited:	
	depth to bedrock (moderately limited)	0.42	depth to bedrock (moderately limited)	0.42	slope (moderately limited)	0.45	depth to bedrock (very limited)	1.00	percs slowly (very limited)	1.00
	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	depth to bedrock (moderately limited)	0.42	slope (moderately limited)	0.45	depth to bedrock (very limited)	1.00
	droughty (slightly limited)	0.22	droughty (slightly limited)	0.22	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	wetness (very limited)	1.00

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73093:										
Gatewood	Limited:		Limited:		Limited:		Very limited:		Very limited:	
	slope (limited)	0.76	slope (limited)	0.76	slope (limited)	0.99	depth to bedrock (very limited)	1.00	percs slowly (very limited)	1.00
	depth to bedrock (moderately limited)	0.42	depth to bedrock (moderately limited)	0.42	depth to bedrock (moderately limited)	0.42	slope (limited)	0.99	slope (very limited)	1.00
	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	depth to bedrock (very limited)	1.00
73094:										
Gatewood	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	depth to bedrock (very limited)	1.00	percs slowly (very limited)	1.00
	depth to bedrock (moderately limited)	0.42	depth to bedrock (moderately limited)	0.42	depth to bedrock (moderately limited)	0.42	slope (very limited)	1.00	slope (very limited)	1.00
	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	wetness (moderately limited)	0.36	depth to bedrock (very limited)	1.00
73095:										
Gravois	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	percs slowly (very limited)	1.00
	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	slope (very limited)	1.00
	wetness (moderately limited)	0.55	wetness (moderately limited)	0.55	wetness (moderately limited)	0.55	wetness (moderately limited)	0.55	wetness (very limited)	1.00
73097:										
Swiss	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	too acid (slightly limited)	0.24	too acid (slightly limited)	0.24	too acid (slightly limited)	0.24	too acid (slightly limited)	0.24	wetness (very limited)	1.00
	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	percs slowly (moderately limited)	0.32
73098:										
Plato	Limited:		Limited:		Limited:		Limited:		Very limited:	
	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94	percs slowly (very limited)	1.00
	droughty (slightly limited)	0.24	droughty (slightly limited)	0.24	droughty (slightly limited)	0.24	too acid (slightly limited)	0.06	wetness (very limited)	1.00
	too acid (slightly limited)	0.06	too acid (slightly limited)	0.06	too acid (slightly limited)	0.06			too acid (slightly limited)	0.21

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73106:										
Mariosa	Very limited: wetness (very limited) droughty (limited)	1.00 0.94	Very limited: wetness (very limited) droughty (limited)	1.00 0.94	Very limited: wetness (very limited) droughty (limited)	1.00 0.94	Very limited: wetness (very limited)	1.00	Very limited: percs slowly (very limited) wetness (very limited) too acid (slightly limited)	1.00 1.00 0.03
73108:										
Gravois	Limited: percs slowly (limited) wetness (moderately limited)	0.60 0.55	Limited: percs slowly (limited) wetness (moderately limited)	0.60 0.55	Limited: percs slowly (limited) wetness (moderately limited) slope (moderately limited)	0.60 0.55 0.30	Limited: percs slowly (limited) wetness (moderately limited) slope (moderately limited)	0.60 0.55 0.30	Very limited: percs slowly (very limited) wetness (very limited) slope (limited)	1.00 1.00 0.91
Gatewood	Moderately limited: depth to bedrock (moderately limited) wetness (moderately limited) droughty (slightly limited)	0.42 0.36 0.22	Moderately limited: depth to bedrock (moderately limited) wetness (moderately limited) droughty (slightly limited)	0.42 0.36 0.22	Moderately limited: depth to bedrock (moderately limited) wetness (moderately limited) slope (moderately limited)	0.42 0.36 0.30	Very limited: depth to bedrock (very limited) wetness (moderately limited) slope (moderately limited)	1.00 0.36 0.30	Very limited: percs slowly (very limited) depth to bedrock (very limited) wetness (very limited)	1.00 1.00 1.00
73109:										
Alred	Very limited: droughty (very limited) slope (very limited) too acid (moderately limited)	1.00 1.00 0.48	Very limited: droughty (very limited) slope (very limited) too acid (moderately limited)	1.00 1.00 0.48	Very limited: slope (very limited) droughty (very limited) too acid (moderately limited)	1.00 1.00 0.48	Very limited: slope (very limited) too acid (moderately limited) large surface stones (slightly limited)	1.00 0.48 0.13	Very limited: percs slowly (very limited) slope (very limited) large surface stones (slightly limited)	1.00 1.00 0.13
73112:										
Gunlock	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited) slope (moderately limited)	0.58 0.30	Moderately limited: wetness (moderately limited) slope (moderately limited)	0.58 0.30	Very limited: percs slowly (very limited) wetness (very limited) slope (limited)	1.00 1.00 0.91

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73135:										
Union	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited)	0.58	Very limited: percs slowly (very limited)	1.00
					slope (moderately limited)	0.30	slope (moderately limited)	0.30	wetness (very limited)	1.00
									slope (limited)	0.91
73136:										
Union	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited)	0.58	Moderately limited: wetness (moderately limited)	0.58	Very limited: percs slowly (very limited)	1.00
									wetness (very limited)	1.00
									too acid (moderately limited)	0.42
73158:										
Cotton	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: percs slowly (very limited)	1.00
	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	wetness (very limited)	1.00
	slope (slightly limited)	0.15	slope (slightly limited)	0.15	slope (moderately limited)	0.45	slope (moderately limited)	0.45	slope (very limited)	1.00
73165:										
Knobby	Very limited: slope (very limited)	1.00	Very limited: droughty (very limited)	1.00	Very limited: droughty (very limited)	1.00	Very limited: depth to bedrock (very limited)	1.00	Very limited: percs slowly (very limited)	1.00
	shallow to bedrock (very limited)	1.00	shallow to bedrock (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	droughty (very limited)	1.00	slope (very limited)	1.00	shallow to bedrock (very limited)	1.00	large surface stones (very limited)	1.00	depth to bedrock (very limited)	1.00
Rock outcrop	Not rated		Not rated		Not rated		Not rated		Not rated	
Bardley	Very limited: slope (very limited)	1.00	Very limited: slope (very limited)	1.00	Very limited: slope (very limited)	1.00	Very limited: depth to bedrock (very limited)	1.00	Very limited: percs slowly (very limited)	1.00
	large surface stones (very limited)	1.00	large surface stones (very limited)	1.00	large surface stones (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	droughty (limited)	0.66	droughty (limited)	0.66	droughty (limited)	0.66	large surface stones (very limited)	1.00	depth to bedrock (very limited)	1.00

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73168:										
Swiss	Moderately limited:		Moderately limited:		Limited:		Limited:		Very limited:	
	slope (moderately limited)	0.60	slope (moderately limited)	0.60	slope (limited)	0.80	slope (limited)	0.80	wetness (very limited)	1.00
	too acid (slightly limited)	0.24	too acid (slightly limited)	0.24	too acid (slightly limited)	0.24	too acid (slightly limited)	0.24	slope (very limited)	1.00
	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	percs slowly (moderately limited)	0.32
73192:										
Beemont	Slightly limited:		Slightly limited:		Moderately limited:		Moderately limited:		Very limited:	
	wetness (slightly limited)	0.28	wetness (slightly limited)	0.28	slope (moderately limited)	0.30	depth to bedrock (moderately limited)	0.36	depth to bedrock (very limited)	1.00
	too acid (slightly limited)	0.18	too acid (slightly limited)	0.18	wetness (slightly limited)	0.28	slope (moderately limited)	0.30	wetness (very limited)	1.00
	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	too acid (slightly limited)	0.18	wetness (slightly limited)	0.28	slope (limited)	0.91
73193:										
Beemont	Limited:		Limited:		Limited:		Limited:		Very limited:	
	slope (limited)	0.76	slope (limited)	0.76	slope (limited)	0.99	slope (limited)	0.99	slope (very limited)	1.00
	wetness (slightly limited)	0.28	wetness (slightly limited)	0.28	wetness (slightly limited)	0.28	depth to bedrock (moderately limited)	0.36	depth to bedrock (very limited)	1.00
	too acid (slightly limited)	0.18	too acid (slightly limited)	0.18	too acid (slightly limited)	0.18	wetness (slightly limited)	0.28	wetness (very limited)	1.00
73194:										
Beemont	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00	slope (very limited)	1.00
	wetness (slightly limited)	0.28	wetness (slightly limited)	0.28	wetness (slightly limited)	0.28	depth to bedrock (moderately limited)	0.36	depth to bedrock (very limited)	1.00
	too acid (slightly limited)	0.18	too acid (slightly limited)	0.18	too acid (slightly limited)	0.18	wetness (slightly limited)	0.28	wetness (very limited)	1.00
73195:										
Useful	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (very limited)	1.00
	wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	slope (moderately limited)	0.30	slope (moderately limited)	0.30	depth to bedrock (very limited)	1.00
					wetness (slightly limited)	0.13	wetness (slightly limited)	0.13	wetness (very limited)	1.00

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73195:										
Moko	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shallow to bedrock (very limited)	1.00	droughty (very limited)	1.00	droughty (very limited)	1.00	depth to bedrock (very limited)	1.00	percs slowly (very limited)	1.00
	droughty (very limited)	1.00	shallow to bedrock (very limited)	1.00	shallow to bedrock (very limited)	1.00	slope (moderately limited)	0.30	depth to bedrock (very limited)	1.00
	large surface stones (slightly limited)	0.13	large surface stones (slightly limited)	0.13	slope (moderately limited)	0.30	large surface stones (slightly limited)	0.13	slope (limited)	0.91
73196:										
Mariosa	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	percs slowly (very limited)	1.00
	droughty (limited)	0.95	droughty (limited)	0.95	droughty (limited)	0.95			wetness (very limited)	1.00
									too acid (slightly limited)	0.03
74633:										
Hartville	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (very limited)	1.00
	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	wetness (very limited)	1.00
74634:										
Hartville	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (very limited)	1.00
	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	wetness (very limited)	1.00
					slope (moderately limited)	0.30	slope (moderately limited)	0.30	slope (limited)	0.91
74656:										
Deible	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	percs slowly (very limited)	1.00
	flooding (slightly limited)	0.30	flooding (slightly limited)	0.30	flooding (slightly limited)	0.30	flooding (slightly limited)	0.30	wetness (very limited)	1.00
	droughty (slightly limited)	0.20	droughty (slightly limited)	0.20	droughty (slightly limited)	0.20				

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75376:										
Cedargap	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: percs slowly (very limited)	1.00
									flooding (very limited)	1.00
									wetness (limited)	0.99
75389:										
Hacreek	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: percs slowly (very limited)	1.00
	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	wetness (very limited)	1.00
	flooding (slightly limited)	0.30	flooding (slightly limited)	0.30	flooding (slightly limited)	0.30	flooding (slightly limited)	0.30		
75395:										
Jamesfin	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Limited: flooding (limited)	0.90	Very limited: percs slowly (very limited)	1.00
									wetness (limited)	0.60
									flooding (moderately limited)	0.60
75398:										
Kaintuck	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00
									percs slowly (moderately limited)	0.32
75399:										
Jamesfin	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: percs slowly (very limited)	1.00
									flooding (very limited)	1.00
									wetness (limited)	0.60

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
75400:										
Gladden	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: percs slowly (very limited) flooding (very limited)	1.00 1.00
75408:										
Secesh	Slightly limited: flooding (slightly limited)	0.30	Slightly limited: flooding (slightly limited)	0.30	Slightly limited: flooding (slightly limited)	0.30	Slightly limited: flooding (slightly limited)	0.30	Very limited: percs slowly (very limited)	1.00
99000:										
Pits, quarries	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

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

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

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

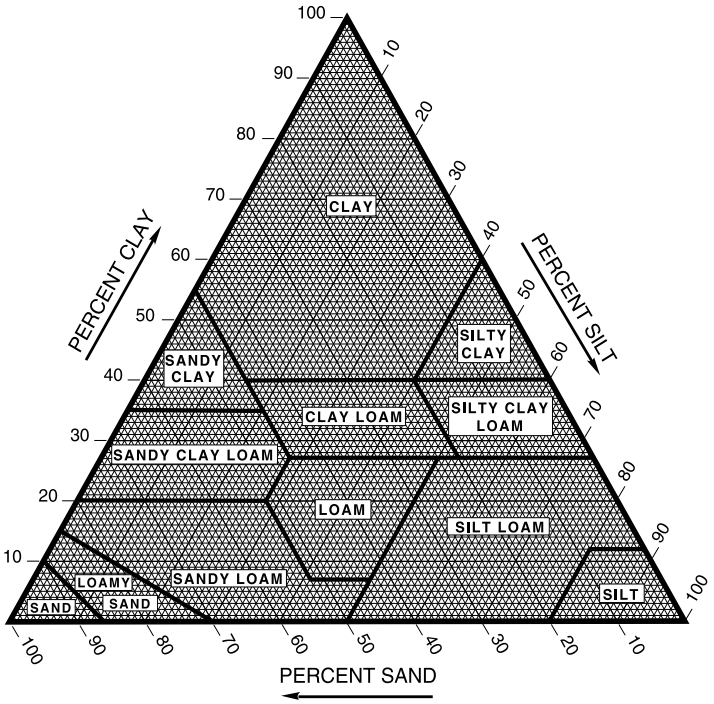


Figure 15.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 17 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

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

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

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

properties of two groups can have a dual classification, for example, CL-ML.

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

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

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

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

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

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

Physical and Chemical Properties

Table 18 shows estimates of some physical and 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.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In the table, 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 and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

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

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

Saturated hydraulic conductivity 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 micrometers per second (um/sec), when the soil is saturated. They are based on soil characteristics

observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

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

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

Effective cation-exchange capacity refers to the sum of extractable bases 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.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. 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, roads, and other structures and to plant roots. Special design commonly is needed.

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

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

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

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

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

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

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

Water Features

Table 19 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

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

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

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

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

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

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

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

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

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

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an

unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Soil Features

Table 20 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, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

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

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

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

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

Table 17.--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	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
64000:												
Racoon	0-6	SIL	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-90	20-40	5-20
	6-26	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-40	5-20
	26-60	SICL	CL	A-6, A-7, A-7-6	0	0	100	100	95-100	85-95	35-50	15-30
64001:												
Freeburg	0-9	SIL	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	70-90	25-35	5-15
	9-13	SIL	CL, CL-ML	A-6, A-4	0	0	100	100	90-100	70-90	25-35	5-15
	13-52	SIL, SICL	CL	A-6, A-7	0	0	100	100	90-100	70-95	30-45	10-25
	52-80	SICL	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	15-25
66003:												
Jemerson	0-9	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	9-50	SIL, SICL	CL	A-6	0	0	100	100	90-100	70-95	25-40	15-20
	50-60	GR-L, SIL	CL, CL-ML	A-4, A-6	0	0	75-100	70-100	60-100	40-90	25-35	5-15
66005:												
Deible	0-10	SIL	CL, CL-ML	A-6, A-4	0	0	100	100	90-100	70-90	25-35	5-15
	10-15	SIL	CL, CL-ML	A-6, A-4	0	0	100	100	90-100	70-90	25-35	5-15
	15-37	SIC, C	CH, CL	A-7, A-7-6	0	0	100	100	90-100	70-90	45-70	25-45
	37-80	SICL, SIC	CL, CH	A-7, A-7-6	0	0	100	100	95-100	75-80	35-65	15-40
70028:												
Moko	0-3	GR-L	SC, GC, CL	A-6	0-5	0-15	55-80	50-75	45-70	35-60	25-35	10-15
	3-8	GRV-L	GC	A-2-6, A-6	0-5	0-15	35-55	30-50	25-45	20-40	25-35	10-15
	8-60	UWB	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
70029:												
Moko	0-4	GR-CL	CL, GC, SC	A-6, A-7	0-3	0-15	55-80	50-75	45-75	35-60	35-45	15-20
	4-7	CNV-CL, CNV-L, FLV-SIL	CL, GC, SC	A-6, A-7, A-2-7	0-5	5-30	35-70	30-65	25-60	20-55	25-45	10-20
	7-60	UWB	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
73012:												
Gravois	0-6	SIL	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	80-100	70-90	20-40	5-15
	6-25	SICL, SIL	CL	A-6, A-7	0	0	90-100	85-100	80-100	70-85	30-45	10-25
	25-35	SICL, GR-SICL, GRV-SIL, SIL, GRX-SIL	GC, CL, SC	A-6, A-7, A-7-6	0	0-15	35-100	30-95	25-90	20-80	25-45	10-20
	35-50	GRV-SICL, SICL, GRV-SIL, GRV-L	SC, GC-GM, GC	A-7-6, A-7, A-6	0	0-15	35-85	30-80	25-80	20-75	25-45	10-25
	50-80	CBV-C, GRV-SIC, GR-SIC, GRV-C	CL, GC	A-7-6, A-2-7, A-7	0	0-60	35-80	30-75	25-70	20-65	45-90	25-60
73035:												
Gravois	0-6	SIL	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	80-100	70-90	20-40	5-15
	6-25	SICL, SIL	CL	A-6, A-7	0	0	90-100	85-100	80-100	70-85	30-45	10-25
	25-35	SICL, GR-SICL, GRV-SIL, GRX-SIL, SIL	GC, CL, SC	A-6, A-7, A-7-6	0	0-15	35-100	30-95	25-90	20-80	25-45	10-25
	35-50	GRV-SICL, SICL, GRV-SIL, GRV-L	SC, GC-GM, GC	A-7, A-6, A-7-6	0	0-15	35-85	30-80	25-80	20-75	25-45	10-25
	50-80	CBV-C, GRV-SIC, GR-SIC, GRV-C	CL, GC	A-2-7, A-7, A-7-6	0	0-60	35-80	30-75	25-70	20-65	45-90	25-60

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
73088, 73089:												
Rueter	0-3	GRV-SIL	GC, GC-GM	A-2-4	0-5	0-10	30-55	25-50	25-50	20-45	10-35	2-15
	3-14	GRV-SIL, GRX-SIL	GC, GC-GM	A-2-6, A-4, A-6, A-2-4	0-5	0-10	20-55	15-50	15-45	10-40	10-35	2-15
	14-45	CBX-L, GRV-L, GRV-SCL	GC, GC-GM	A-2-4, A-1-a, A-2-6	0-5	10-50	30-60	25-55	25-55	10-45	15-40	5-20
	45-80	CBX-C, GRV-C	GC-GM	A-2-7, A-7	0-5	10-50	30-60	25-55	25-55	20-50	50-75	25-60
73090:												
Useful	0-7	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-15
	7-31	SIC, SICL	CL	A-7-6, A-7	0	0-10	90-100	85-100	80-100	75-95	40-50	20-30
	31-45	SIC, GRV-SIC, C, GRV-C	CL, GC, CH	A-7-6, A-7	0	0-10	55-100	50-100	50-95	45-95	45-65	25-40
	45-53	SICL, SIC	CH, CL	A-7, A-7-6	0	0	90-100	85-100	80-95	75-95	40-60	20-30
	53-60	UWB	---	---	---	---	---	---	---	---	---	---
73091:												
Useful	0-7	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-15
	7-31	SIC, SICL	CL	A-7, A-7-6	0	0-10	95-100	85-100	80-100	70-95	40-50	20-30
	31-45	SIC, GRV-SIC, C, GRV-C	CL, GC, CH	A-7-6, A-7	0	0-10	55-100	50-100	45-95	40-95	40-65	20-40
	45-53	SICL, SIC	CH, CL	A-7-6, A-7	0	0	95-100	85-100	80-95	75-95	40-60	20-30
	53-60	UWB	---	---	---	---	---	---	---	---	---	---
73092, 73093, 73094:												
Gatewood	0-2	GRV-SIL	GC, GC-GM, SC	A-4, A-6, A-2-6	0	0-20	35-70	30-65	30-60	25-55	20-35	5-15
	2-10	GRV-SIL	GC, GC-GM	A-4, A-6, A-2-6	0-5	0-20	35-70	30-65	30-60	25-55	20-35	5-15
	10-28	C	CH	A-7, A-7-6	0-5	0-10	85-100	80-95	80-85	70-80	50-75	25-45
	28-60	UWB	---	---	---	---	---	---	---	---	---	---
73095:												
Gravois	0-6	SIL	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	80-100	70-90	20-40	5-15
	6-25	SICL, SIL	CL	A-6, A-7	0	0-5	90-100	85-100	80-100	70-85	30-45	10-25
	25-35	SICL, GR-SICL, GRV-SIL, GRX-SIL, SIL	GC, CL, SC	A-6, A-7, A-7-6	0	0-15	35-100	30-95	25-90	20-80	25-45	10-25
	35-50	GRV-SICL, SICL, GRV-SIL, GRV-L	SC, GC-GM, GC	A-7, A-6, A-7-6	0	0-15	35-85	30-80	25-80	20-75	25-45	10-25
	50-80	CBV-C, GRV-SIC, GR-SIC, GRV-C	CL, GC	A-2-7, A-7, A-7-6	0	0-60	35-80	30-75	25-70	20-65	45-90	25-60
73097:												
Swiss	0-3	GR-SIL	CL, SC	A-4, A-6	0	0-25	60-95	50-90	45-90	30-85	25-45	5-20
	3-9	GR-SIL, GR-L	CL, SC	A-4, A-6	0	0-25	60-95	50-90	45-90	30-85	25-45	5-20
	9-40	C, GR-C, SIC, GR-SIC	CH, SC	A-7, A-7-6	0	0-25	55-100	50-100	45-100	40-95	55-75	35-50
	40-80	SIC, CL, C	CL, CH	A-7, A-7-6	0	0-25	100	100	90-100	90-100	45-65	20-40
73098:												
Plato	0-8	SIL	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	70-90	25-35	5-15
	8-20	SIC	CH	A-7, A-7-6	0	0	100	100	95-100	90-95	50-65	25-40
	20-48	GRX-SIL, GRV-SICL	GC, GC-GM	A-1-b, A-4, A-6, A-2-6	0	0-5	25-55	20-50	15-50	10-45	25-45	5-20
	48-60	C, GR-C, GR-SICL	CH, CL	A-6, A-7, A-7-6	0	0-5	55-95	50-90	45-90	40-80	35-85	15-60
73106:												
Mariosa	0-7	SIL	CL	A-6	0	0	100	100	90-100	70-90	25-45	10-25
	7-11	SIL	CL	A-6	0	0	100	100	90-100	70-90	25-45	10-25
	11-38	SIC, SICL	CH, CL	A-7-6	0	0	100	100	95-100	85-95	45-75	30-50
	38-80	SIL, SICL	CH, CL	A-6, A-7-6	0	0	95-100	90-100	85-100	65-95	35-55	15-35

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
73108:												
Gravois	0-6	SIL	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	80-100	70-90	20-40	5-15
	6-25	SICL, SIL	CL	A-6, A-7	0	0-5	90-100	85-100	80-100	70-85	30-45	10-25
	25-35	SICL, GR-SICL, GRV-SIL	GC, CL, SC	A-6, A-7, A-7-6	0	0-15	35-100	30-95	25-90	20-80	25-45	10-25
	35-50	GRV-SICL, SICL, GRV-SIL	GC-GM, GC, SC	A-7, A-6, A-7-6	0	0-15	35-85	30-80	25-80	20-75	25-45	10-25
	50-80	CBV-C, GRV-SIC, GR-SIC	GC, CL	A-2-7, A-7, A-7-6	0	0-60	35-80	30-75	25-70	20-65	45-90	25-60
Gatewood	0-2	GRV-SIL	GC, GC-GM	A-4, A-6, A-2-6	0	0-20	35-70	30-65	30-60	25-55	20-35	5-15
	2-10	GRV-SIL	GC-GM, GC	A-4, A-6, A-2-6	0-5	0-20	35-70	30-65	30-60	25-55	20-35	5-15
	10-28	C	CH	A-7, A-7-6	0-5	0-10	85-100	80-95	80-85	70-80	50-75	25-45
	28-60	UWB	---	---	---	---	---	---	---	---	---	---
73109:												
Alred	0-7	GR-SIL	CL, CL-ML	A-4	0-5	0-20	55-85	50-75	45-75	35-70	20-30	5-10
	7-15	GRV-L	GC-GM, GC	A-2, A-4, A-1, A-2-4	0-5	0-20	35-70	30-50	25-50	20-45	20-30	5-10
	15-21	GRV-L, GRX-SICL	GC-GM, GC	A-2, A-6, A-2-6	0-5	0-20	25-65	20-50	20-50	15-45	25-40	10-15
	21-80	CB-C, GR-C, C	CH	A-7-6	0	0-20	60-100	55-100	50-100	40-85	50-75	30-45
73112:												
Gunlock	0-5	SIL	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	75-90	25-35	5-15
	5-25	SICL, SIC, SIL	CH, CL	A-7-6, A-7	0	0	90-100	85-100	80-100	65-95	35-55	15-30
	25-43	SICL, GR-SICL, GRV-SIL, SIL	CL, GC, SC	A-6, A-7	0	0-10	45-95	40-90	35-90	30-85	30-45	10-20
	43-55	GRX-SICL, GRX-SIC, GRV-CL	GC	A-2-7	0	0-10	20-40	15-35	15-35	15-25	40-65	20-40
	55-80	GR-SIC, GR-C, SIC	CH, CL	A-7, A-7-6	0	0-10	55-95	50-90	50-85	45-80	45-85	25-60
73135, 73136:												
Union	0-9	SIL	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-35	5-15
	9-30	SICL, SIC	CH, CL	A-7-6, A-6, A-7	0	0	90-100	85-95	80-95	70-80	35-60	15-30
	30-53	GRX-SIL, CBX-L	GC	A-2	0	15-40	15-30	10-25	10-20	10-15	25-35	10-15
	53-80	C, GRV-C, GR-SIC	GC, SC, CH	A-7-6, A-7	0	0-15	55-95	50-85	50-80	45-70	50-85	25-60
73158:												
Cotton	0-7	SIL	CL	A-6	0	0	100	95-100	90-100	70-90	30-45	10-25
	7-11	SIL, SICL	CL	A-6, A-7	0	0	100	95-100	90-100	70-95	40-50	20-30
	11-26	SIC, SICL	CH	A-7	0	0	100	95-100	90-100	85-95	50-70	30-45
	26-55	SIL, SICL, GR-SIL	CL, GC-GM	A-6	0-5	0-10	75-100	70-100	65-95	55-90	30-50	10-30
	55-80	GR-C, SIC	CH	A-7	0-10	0-10	60-95	55-90	55-90	50-85	55-75	35-50
73165:												
Knobby	0-3	CBV-SL	GC, GC-GM	A-2, A-2-4	0-10	20-35	45-65	40-60	25-40	10-20	20-30	5-10
	3-7	GRV-SL, CNX-SL, GRV-L	SC, SC-SM, GC, GC-GM	A-1-b, A-2-4	0-10	15-30	25-55	20-50	10-45	5-35	20-30	5-10
	7-60	UWB	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
Bardley	0-4	GRV-SIL	GC, GC-GM	A-6	0-5	0-5	35-55	30-50	25-45	20-40	25-40	10-15
	4-8	GRX-SIL	GC	A-2-6	0-5	0-15	20-35	15-30	15-30	10-25	25-40	10-15
	8-27	C, GR-C	CH	A-7, A-7-6	0	0-10	75-100	70-100	65-95	60-85	65-95	40-70
	27-60	UWB	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
73168:												
Swiss	0-3	GR-SIL	SC, CL	A-4, A-6	0	0-5	55-80	50-75	50-70	40-60	20-40	5-15
	3-9	GR-SIL, GR-L	CL, SC	A-4, A-6	0	0-5	55-80	50-75	50-70	40-60	20-40	5-15
	9-40	C, GR-C, SIC, GR-SIC	CH, SC	A-7, A-7-6	0	0-5	55-100	50-100	50-100	45-95	50-70	25-45
	40-80	CL, SIC, C	CL, CH	A-7, A-7-6	0	0-5	100	100	90-100	70-90	40-70	15-45
73192:												
Beemont	0-6	GR-SIL	CL, GC, SC	A-6	0	0-5	60-80	55-75	50-70	40-60	25-45	10-25
	6-20	GRV-L, GRV-SIL	GC	A-6	0	0-10	35-55	30-50	25-50	20-40	25-45	10-25
	20-53	C	CH	A-7	0	0-5	85-100	80-100	80-95	70-85	75-95	50-70
	53-80	UWB	---	---	---	---	---	---	---	---	---	---
73193, 73194:												
Beemont	0-6	GRV-SIL	CL, GC, SC	A-2-6, A-6	0	0-10	35-65	30-60	30-60	25-50	25-45	10-25
	6-20	GRV-L, GRV-SIL	GC	A-6	0	0-10	35-55	30-50	25-50	20-40	25-45	10-25
	20-53	C	CH	A-7	0	0-5	85-100	80-100	80-95	70-85	75-95	50-70
	53-80	UWB	---	---	---	---	---	---	---	---	---	---
73195:												
Useful	0-7	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-15
	7-31	SIC, SICL	CL	A-7-6, A-7	0	0-10	95-100	85-100	80-100	70-95	40-50	20-30
	31-45	SIC, GRV-SIC, C, GRV-C	CL, GC, CH	A-7-6, A-7	0	0-10	55-100	50-100	45-95	40-95	40-65	20-40
	45-53	SICL, SIC	CH, CL	A-7-6, A-7	0	0	95-100	85-100	80-95	75-95	40-60	20-30
	53-60	UWB	---	---	---	---	---	---	---	---	---	---
Moko	0-4	GR-CL	CL, GC, SC	A-6, A-7	0-3	0-15	55-80	50-75	45-75	35-60	35-45	15-20
	4-7	CNV-CL, CNV-L, FLV-SIL	CL, GC, SC	A-6, A-7, A-2-7	0-5	5-30	35-70	30-65	25-60	20-55	25-45	10-20
	7-60	UWB	---	---	---	---	---	---	---	---	---	---
73196:												
Mariosa	0-8	SIL	CL	A-6	0	0	100	100	90-100	70-90	25-45	10-25
	8-24	SIC, SICL	CH, CL	A-7-6	0	0	100	100	95-100	85-95	45-75	30-50
	24-80	SIL, SICL	CH, CL	A-6, A-7-6	0	0	95-100	90-100	85-100	65-95	35-55	15-35
74633:												
Hartville	0-7	SIL	CL, CL-ML	A-6, A-4	0	0	100	95-100	85-100	65-90	25-40	5-15
	7-12	SIL	CL, CL-ML	A-6, A-4	0	0	100	95-100	85-100	65-90	25-40	5-15
	12-48	SICL, SIC	CH, CL	A-7-6	0	0	100	95-100	90-100	80-95	45-55	20-30
	48-80	SICL	CL	A-7-6, A-6	0	0	95-100	90-100	85-100	75-95	40-50	20-30
74634:												
Hartville	0-7	SIL	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	65-90	25-40	5-15
	7-12	SIL	CL-ML, CL	A-6, A-4	0	0	100	95-100	85-100	65-90	25-40	5-15
	12-48	SICL, SIC	CH, CL	A-7-6	0	0	100	95-100	90-100	80-95	45-55	20-30
	48-80	C, SICL	CL	A-7-6, A-6	0	0	95-100	90-100	85-100	75-95	40-60	20-30
74656:												
Deible	0-10	SIL	CL, CL-ML	A-6, A-4	0	0	100	100	90-100	70-90	20-35	5-15
	10-15	SIL	CL, CL-ML	A-6, A-4	0	0	100	100	90-100	70-90	20-35	5-15
	15-37	SIC, C	CH	A-7, A-7-6	0	0	100	100	90-100	70-90	50-85	25-60
	37-80	SICL, SIC	CL, CH	A-7, A-7-6	0	0	100	100	95-100	75-80	35-65	15-40

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
75376:												
Cedargap	0-9	GR-SIL	CL-ML, CL	A-4, A-6	0	0-10	55-80	50-75	45-75	35-70	20-35	5-15
	9-18	GRV-L, GRV-SCL, GRX-COSL, GRV-SIL, GRX-SCL	GC, GC-GM	A-2-6, A-2-4	0	0-10	30-55	25-50	15-50	10-45	20-45	5-25
	18-49	GR-COSL, GRX-COSL, GRV-COSL, GRX-CL, GRV-CL, GRX-SCL, GRV-SCL, GRV-L, GRV-SICL	GC-GM, GC	A-2-6, A-2-4	0	0-10	25-65	20-60	15-50	10-45	25-45	5-20
	49-60	C, GRV-C, GRX-SCL, GRX-SC, GR-C	GC	A-2-7, A-7-6	0	0-15	30-85	25-80	20-75	10-70	50-85	25-60
75389:												
Hacreek	0-9	SIL	CL	A-6	0	0	100	100	90-100	70-95	30-40	10-20
	9-21	SICL	CL	A-6, A-7, A-7-6	0	0	100	100	95-100	85-95	40-45	15-25
	21-28	SICL	CL	A-6, A-7, A-7-6	0	0	100	100	95-100	85-95	40-45	15-25
	28-70	SICL	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	15-25
	70-81	SICL	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	15-25
75395:												
Jamesfin	0-10	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-20
	10-60	SIL, SICL	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	70-90	25-45	5-25
75398:												
Kaintuck	0-6	FSL	CL-ML, ML, SC-SM, SM	A-4	0	0	80-100	75-100	60-80	35-50	10-30	NP-10
	6-80	SR--FS, LFS, FSL, L, SIL	CL-ML, SC-SM, ML, SM	A-4	0	0-5	80-100	75-100	55-95	20-85	10-30	NP-10
75399:												
Jamesfin	0-10	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-20
	10-60	SIL, SICL	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	70-90	25-45	5-25
75400:												
Gladden	0-6	SIL	CL-ML, CL	A-6, A-4	0	0	85-100	80-100	75-100	60-90	20-35	5-15
	6-38	SIL, L	CL-ML, ML	A-4	0	0	85-100	80-100	70-100	50-90	20-30	NP-10
	38-60	SR--GRX-S, GRV-LS, GRX-L	GM, GC	A-1, A-2-4, A-1-a	0	0-20	15-45	10-40	5-40	5-25	0-25	NP-10
75408:												
Secesh	0-6	SIL	CL, CL-ML	A-4	0	0	85-100	80-100	80-95	65-85	20-35	5-15
	6-16	SICL	CL	A-6	0	0	85-100	80-100	80-95	75-90	30-45	10-20
	16-42	L, GR-L	GC, SC, CL	A-4, A-6	0	0	60-95	55-90	50-80	40-60	20-35	5-15
	42-80	GRV-SCL, SICL, GR-SICL	SC, GC	A-6	0	0-10	60-95	55-90	50-90	25-80	30-45	10-20
99000. Pits, quarries												
99001. Water												

Table 18.--Physical and Chemical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensibility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodibility group	Wind erodibility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	meq/100 g	meq/100 g	pH	Pct	Pct					
64000:																	
Racoon	0-6	2-10	60-80	12-27	1.30-1.50	1.40-4.00	0.22-0.24	14-20	16-22	4.5-7.3	0.1-2.9	1.0-2.0	.37	.37	5	6	48
	6-26	2-10	60-80	12-27	1.35-1.50	1.40-4.00	0.20-0.22	11-16	9.0-14	4.5-7.3	0.1-2.9	0.2-1.0	.37	.37			
	26-60	2-10	50-70	27-40	1.35-1.60	0.42-1.40	0.18-0.20	16-23	5.0-15	4.5-7.3	3.0-5.9	0.2-1.0	.37	.37			
64001:																	
Freeburg	0-9	2-5	60-80	12-27	1.20-1.45	4.00-14.00	0.22-0.24	14-20	8.0-15	4.5-7.3	0.1-2.9	1.0-3.0	.37	.37	5	6	48
	9-13	2-5	60-80	12-27	1.40-1.50	4.00-14.00	0.18-0.20	11-20	7.0-17	4.5-6.0	0.1-2.9	0.5-2.0	.37	.37			
	13-52	2-10	60-80	20-40	1.40-1.50	1.40-4.00	0.18-0.20	13-20	11-18	4.5-7.3	3.0-5.9	0.5-1.0	.37	.37			
	52-80	5-20	50-70	27-35	1.35-1.50	1.40-4.00	0.16-0.19	14-20	11-18	4.5-7.3	3.0-5.9	0.2-0.8	.37	.37			
66003:																	
Jemerson	0-9	5-15	60-80	12-27	1.25-1.40	4.00-14.00	0.22-0.24	8.0-16	3.0-12	5.1-7.3	0.1-2.9	0.5-2.0	.37	.37	5	6	48
	9-50	5-15	55-75	12-35	1.30-1.50	4.00-14.00	0.18-0.22	12-18	8.0-15	5.1-7.3	3.0-5.9	0.1-1.0	.37	.37			
	50-60	30-50	30-55	15-27	1.30-1.45	4.00-14.00	0.17-0.22	12-18	6.0-15	5.1-7.3	0.1-2.9	0.1-0.5	.37	.37			
66005:																	
Deible	0-10	5-15	60-80	12-27	1.30-1.45	4.00-14.00	0.22-0.24	7.0-20	5.0-18	4.5-7.8	0.1-2.9	1.0-4.0	.43	.43	3	5	56
	10-15	5-15	60-80	12-27	1.30-1.45	4.00-14.00	0.20-0.22	7.0-20	5.0-17	4.5-7.8	0.1-2.9	0.5-2.0	.43	.43			
	15-37	2-10	35-55	40-80	1.35-1.50	0.14-0.42	0.08-0.12	20-35	14-30	4.5-7.8	6.0-8.9	0.1-1.0	.32	.32			
	37-80	5-20	45-60	27-60	1.35-1.50	1.40-4.00	0.08-0.11	10-20	9.0-16	5.1-7.8	6.0-8.9	0.1-0.5	.32	.32			
70028:																	
Moko	0-3	25-45	30-50	18-27	1.25-1.50	4.00-14.00	0.07-0.13	15-40	15-45	5.1-7.8	0.1-2.9	2.0-6.0	.24	.37	1	8	0
	3-8	25-45	30-50	18-27	1.25-1.60	4.00-14.00	0.03-0.14	15-40	15-40	6.1-7.8	0.1-2.9	2.0-6.0	.20	.37			
	8-60	---	---	---	---	0.00-1.40	---	---	---	---	---	---	---	---			
Rock outcrop.																	
70029:																	
Moko	0-4	25-45	20-45	27-40	1.25-1.50	4.00-14.00	0.11-0.12	15-40	15-45	5.1-7.8	0.1-2.9	2.0-6.0	.24	.37	1	8	0
	4-7	25-45	25-55	18-35	1.25-1.60	4.00-14.00	0.03-0.14	15-40	15-40	6.1-7.8	0.1-2.9	2.0-6.0	.20	.37			
	7-60	---	---	---	---	0.00-1.40	---	---	---	---	---	---	---	---			
Rock outcrop.																	
73012:																	
Gravois	0-6	5-15	65-85	12-27	1.20-1.50	4.00-14.00	0.20-0.22	8.0-15	5.0-11	5.1-6.5	0.1-2.9	1.0-3.0	.37	.37	4	5	56
	6-25	5-15	50-75	20-35	1.30-1.50	1.40-4.00	0.12-0.18	10-24	6.0-19	4.5-7.3	3.0-5.9	0.3-1.0	.43	.43			
	25-35	5-15	45-70	15-35	1.50-1.70	0.42-1.40	0.08-0.12	10-18	6.0-14	4.5-7.3	0.1-2.9	0.1-0.5	.32	.43			
	35-50	5-30	45-70	15-35	1.45-1.65	1.40-4.00	0.10-0.13	10-18	6.0-14	4.5-7.3	3.0-5.9	0.1-0.5	.32	.43			
	50-80	5-25	10-42	40-80	1.30-1.50	1.40-4.00	0.04-0.10	25-36	25-40	6.6-7.8	6.0-8.9	0.1-0.5	.28	.32			

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensibility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodibility group	Wind erodibility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	meq/100 g	meq/100 g	pH	Pct	Pct					
73035:																	
Gravois	0-6	2-10	65-80	12-27	1.20-1.50	4.00-14.00	0.20-0.22	8.0-15	5.0-11	5.1-6.5	0.1-2.9	1.0-3.0	.37	.37	4	5	56
	6-25	2-10	55-75	20-35	1.30-1.50	1.40-4.00	0.12-0.18	10-24	6.0-19	4.5-7.3	3.0-5.9	0.3-1.0	.43	.43			
	25-35	5-15	45-70	15-35	1.50-1.70	0.42-1.40	0.08-0.12	10-18	6.0-14	4.5-7.3	0.1-2.9	0.1-0.5	.32	.43			
	35-50	5-30	45-70	15-35	1.45-1.65	1.40-4.00	0.10-0.13	10-18	6.0-14	4.5-7.3	3.0-5.9	0.1-0.5	.32	.43			
	50-80	5-20	15-45	40-80	1.30-1.50	1.40-4.00	0.04-0.10	25-36	25-40	6.6-7.8	6.0-8.9	0.1-0.5	.28	.32			
73088, 73089:																	
Rueter	0-3	20-45	55-75	4-27	1.20-1.40	14.00-42.00	0.07-0.12	2.0-11	1.0-8.0	3.5-6.0	0.1-2.9	0.5-2.0	.28	.37	3	8	0
	3-14	20-45	55-75	4-27	1.20-1.40	14.00-42.00	0.07-0.12	4.0-10	1.0-6.0	3.5-6.0	0.1-2.9	0.5-1.0	.37	.43			
	14-45	35-60	25-40	7-35	1.30-1.50	14.00-42.00	0.05-0.10	2.0-12	1.0-10	3.5-6.0	0.1-2.9	0.1-0.5	.32	.43			
	45-80	15-35	15-45	40-80	1.20-1.40	4.00-14.00	0.02-0.05	10-32	7.0-29	3.5-6.0	6.0-8.9	0.1-0.5	.20	.32			
73090:																	
Useful	0-7	2-10	55-80	15-27	1.35-1.45	4.00-14.00	0.22-0.24	10-17	7.0-14	5.1-6.5	0.1-2.9	2.0-4.0	.37	.37	4	6	48
	7-31	2-10	45-65	35-45	1.25-1.35	4.00-14.00	0.11-0.18	18-23	15-20	4.5-7.3	6.0-8.9	0.5-1.0	.32	.32			
	31-45	2-10	35-55	40-60	1.25-1.55	1.40-4.00	0.05-0.12	18-30	15-27	4.5-7.8	6.0-8.9	0.1-0.5	.32	.32			
	45-53	5-20	40-60	35-55	1.25-1.50	1.40-4.00	0.05-0.12	18-30	15-27	4.5-8.4	6.0-8.9	0.1-0.5	.32	.43			
	53-60	---	---	---	---	0.07-0.42	---	---	---	---	---	---	---	---			
73091:																	
Useful	0-7	2-10	60-80	15-27	1.35-1.45	4.00-14.00	0.22-0.24	10-17	7.0-14	5.1-6.5	0.1-2.9	2.0-4.0	.37	.37	4	6	48
	7-31	2-10	45-65	35-45	1.25-1.35	4.00-14.00	0.11-0.18	18-23	15-20	4.5-7.3	6.0-8.9	0.5-1.0	.32	.32			
	31-45	2-10	35-55	40-60	1.25-1.55	1.40-4.00	0.05-0.12	18-30	15-27	4.5-7.8	6.0-8.9	0.1-0.5	.32	.32			
	45-53	5-20	40-60	35-60	1.25-1.50	1.40-4.00	0.05-0.12	18-30	15-27	4.5-7.8	6.0-8.9	0.1-0.5	.32	.43			
	53-60	---	---	---	---	0.07-0.42	---	---	---	---	---	---	---	---			
73092, 73093, 73094:																	
Gatewood	0-2	20-40	50-70	12-27	1.10-1.40	4.00-14.00	0.14-0.16	10-30	9.0-29	5.1-7.3	0.1-2.9	0.5-3.0	.28	.43	2	8	0
	2-10	20-40	50-70	12-27	1.10-1.30	4.00-14.00	0.12-0.14	10-18	8.0-16	5.1-7.3	0.1-2.9	0.5-1.0	.28	.43			
	10-28	5-20	15-35	40-80	1.35-1.60	0.42-1.40	0.08-0.14	30-44	27-41	5.1-7.8	6.0-8.9	0.5-1.0	.20	.28			
	28-60	---	---	---	---	0.07-0.42	---	---	---	---	---	---	---	---			
73095:																	
Gravois	0-6	2-10	65-80	12-27	1.20-1.50	4.00-14.00	0.20-0.22	8.0-15	5.0-11	5.1-6.5	0.1-2.9	1.0-2.5	.37	.37	4	5	56
	6-25	2-10	55-75	20-35	1.30-1.50	1.40-4.00	0.12-0.18	10-24	6.0-19	4.5-7.3	3.0-5.9	0.3-1.0	.43	.43			
	25-35	5-15	45-70	15-35	1.50-1.70	0.42-1.40	0.08-0.12	10-18	6.0-14	4.5-7.3	0.1-2.9	0.1-0.5	.32	.43			
	35-50	5-30	45-70	15-35	1.45-1.65	1.40-4.00	0.10-0.13	10-18	6.0-14	4.5-7.3	3.0-5.9	0.1-0.5	.32	.43			
	50-80	5-20	15-45	40-80	1.30-1.50	1.40-4.00	0.04-0.10	25-36	25-40	6.6-7.8	6.0-8.9	0.1-0.5	.28	.32			
73097:																	
Swiss	0-3	15-30	60-80	8-27	1.10-1.40	14.00-42.00	0.10-0.19	15-22	3.0-9.0	4.5-6.5	0.1-2.9	2.5-4.5	.32	.37	3	8	0
	3-9	20-40	45-65	7-27	1.10-1.45	14.00-42.00	0.10-0.19	5.0-12	2.0-7.0	4.5-6.5	0.1-2.9	0.5-1.2	.32	.37			
	9-40	10-30	25-45	40-65	1.40-1.55	0.14-0.42	0.08-0.10	20-26	13-20	3.5-7.3	6.0-8.9	0.2-0.8	.24	.32			
	40-80	15-45	20-45	27-65	1.50-1.90	0.14-0.42	0.05-0.10	6.0-12	4.0-11	5.1-6.5	3.0-5.9	0.1-0.2	.20	.32			

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
													Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	meq/100 g	meq/100 g	pH	Pct	Pct					
73098:																	
Plato	0-8	2-10	60-80	12-27	1.20-1.50	4.00-14.00	0.22-0.24	6.0-16	4.0-13	5.1-7.3	0.1-2.9	1.0-2.0	.43	.43	4	5	56
	8-20	2-10	40-60	40-60	1.30-1.50	1.40-4.00	0.11-0.13	14-30	8.0-24	3.5-6.0	6.0-8.9	0.5-1.0	.37	.37			
	20-48	5-15	55-75	12-35	1.60-1.90	0.14-0.42	0.01-0.05	10-16	7.0-13	3.5-6.0	0.1-2.9	0.1-0.5	.24	.43			
	48-60	2-10	20-55	27-80	1.40-1.60	4.00-14.00	0.02-0.06	18-36	14-32	4.5-6.0	6.0-8.9	0.1-0.5	.24	.32			
73106:																	
Mariosa	0-7	2-10	60-80	12-27	1.25-1.45	4.00-14.00	0.22-0.24	8.0-16	6.0-14	4.5-7.8	0.1-2.9	1.0-3.0	.43	.43	5	6	48
	7-11	2-10	60-80	12-27	1.30-1.50	0.42-1.40	0.15-0.20	5.0-13	4.0-12	4.5-7.3	0.1-2.9	0.5-1.0	.43	.43			
	11-38	2-10	40-65	35-60	1.30-1.50	0.14-0.42	0.09-0.20	18-34	12-28	4.5-6.5	6.0-8.9	0.5-1.0	.43	.43			
	38-80	5-15	50-65	18-40	1.50-1.70	0.14-0.42	0.08-0.16	9.0-26	6.0-23	4.5-6.5	3.0-5.9	0.1-0.5	.43	.43			
73108:																	
Gravois	0-6	2-10	65-80	12-27	1.20-1.50	4.00-14.00	0.20-0.22	8.0-15	5.0-11	5.1-6.5	0.1-2.9	1.0-2.5	.37	.37	4	5	56
	6-25	2-10	55-75	20-35	1.30-1.50	1.40-4.00	0.12-0.18	10-24	6.0-19	4.5-7.3	3.0-5.9	0.3-1.0	.43	.43			
	25-35	5-15	45-70	15-35	1.50-1.70	0.42-1.40	0.08-0.12	10-18	6.0-14	4.5-7.3	0.1-2.9	0.1-0.5	.32	.43			
	35-50	5-15	45-70	15-35	1.45-1.65	1.40-4.00	0.10-0.13	10-18	6.0-14	4.5-7.3	3.0-5.9	0.1-0.5	.32	.43			
	50-80	5-20	15-45	40-80	1.30-1.50	1.40-4.00	0.04-0.10	25-36	25-40	6.6-7.8	6.0-8.9	0.1-0.5	.28	.32			
Gatewood	0-2	20-40	50-70	12-27	1.10-1.40	4.00-14.00	0.14-0.16	10-30	9.0-29	5.1-7.3	0.1-2.9	0.5-3.0	.28	.43	2	8	0
	2-10	20-40	50-70	12-27	1.10-1.30	4.00-14.00	0.12-0.14	10-18	8.0-16	5.1-7.3	0.1-2.9	0.5-1.0	.28	.43			
	10-28	5-20	15-35	40-80	1.35-1.60	0.42-1.40	0.08-0.14	30-44	27-41	5.1-7.8	6.0-8.9	0.5-1.0	.20	.28			
	28-60	---	---	---	---	0.07-0.42	---	---	---	---	---	---	---	---			
73109:																	
Alred	0-7	20-35	55-70	10-22	1.30-1.50	4.00-14.00	0.08-0.12	5.5-12	2.0-9.0	4.5-6.5	0.1-2.9	1.0-2.0	.10	.32	4	8	0
	7-15	30-45	30-50	10-22	1.40-1.60	4.00-14.00	0.06-0.10	4.0-12	2.0-9.0	4.5-6.5	0.1-2.9	0.5-1.0	.10	.32			
	15-21	18-45	35-55	12-35	1.30-1.50	4.00-14.00	0.07-0.12	7.5-13	3.0-10	4.5-6.0	0.1-2.9	0.3-0.5	.20	.28			
	21-80	15-35	10-25	42-80	1.40-1.60	0.42-1.40	0.08-0.11	14-27	13-26	3.5-7.3	6.0-8.9	0.1-0.5	.10	.28			
73112:																	
Gunlock	0-5	3-15	55-80	15-27	1.20-1.50	4.00-14.00	0.20-0.22	8.0-15	5.0-12	5.1-7.3	0.1-2.9	1.0-2.0	.37	.37	4	5	56
	5-25	3-10	45-65	22-45	1.30-1.50	1.40-4.00	0.12-0.18	18-24	14-20	4.5-7.3	3.0-5.9	0.5-1.0	.37	.43			
	25-43	5-20	50-65	20-35	1.50-1.70	0.42-1.40	0.08-0.14	10-18	7.0-14	4.5-7.3	0.1-2.9	0.1-0.5	.37	.43			
	43-55	5-25	40-60	35-60	1.30-1.50	1.40-4.00	0.06-0.13	18-34	14-29	4.5-7.8	6.0-8.9	0.1-0.5	.37	.43			
	55-80	5-25	15-41	40-80	1.30-1.50	1.40-4.00	0.06-0.18	25-36	20-32	4.5-7.8	6.0-8.9	0.1-0.5	.37	.37			
73135:																	
Union	0-9	2-10	60-80	10-27	1.35-1.45	4.00-14.00	0.18-0.22	6.0-16	4.0-14	4.5-6.5	0.1-2.9	0.5-2.0	.43	.43	4	5	56
	9-30	2-10	45-65	27-50	1.30-1.40	4.00-14.00	0.14-0.19	14-24	10-20	3.5-5.5	3.0-5.9	0.5-1.0	.43	.43			
	30-53	20-45	45-65	15-27	1.60-1.90	0.42-1.40	0.01-0.05	8.0-18	5.0-15	3.5-5.5	0.1-2.9	0.1-0.5	.10	.43			
	53-80	2-10	15-45	40-80	1.30-1.45	1.40-4.00	0.02-0.06	20-40	15-35	4.5-6.5	6.0-8.9	0.1-0.5	.17	.28			

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
													Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	meq/100 g	meq/100 g	pH	Pct	Pct					
73136:																	
Union	0-9	2-10	65-80	10-27	1.35-1.45	4.00-14.00	0.18-0.22	6.0-16	4.0-14	4.5-6.5	0.1-2.9	0.5-2.0	.43	.43	4	5	56
	9-30	2-10	45-65	27-50	1.30-1.40	4.00-14.00	0.14-0.19	14-24	10-20	3.5-5.5	3.0-5.9	0.5-1.0	.43	.43			
	30-53	15-35	45-65	15-27	1.60-1.90	0.42-1.40	0.01-0.05	8.0-18	5.0-15	3.5-5.5	0.1-2.9	0.1-0.5	.10	.43			
	53-80	5-10	15-45	40-80	1.30-1.45	1.40-4.00	0.02-0.06	20-40	15-35	4.5-6.0	6.0-8.9	0.1-0.5	.17	.28			
73158:																	
Cotton	0-7	2-10	60-80	12-27	1.35-1.55	4.00-14.00	0.22-0.24	9.0-15	5.0-11	5.1-7.3	0.1-2.9	1.0-3.0	.37	.37	3	5	56
	7-11	2-10	55-75	25-35	1.35-1.55	1.40-4.00	0.16-0.22	14-22	11-19	5.1-7.3	0.1-2.9	0.5-1.0	.43	.43			
	11-26	2-10	42-65	35-55	1.30-1.55	0.42-1.40	0.11-0.16	15-30	10-25	4.5-7.3	6.0-8.9	0.5-1.0	.32	.32			
	26-55	5-15	55-75	12-32	1.50-1.70	0.42-1.40	0.08-0.15	10-23	8.0-21	5.1-7.3	0.1-2.9	0.0-0.5	.24	.24			
	55-80	5-20	20-45	40-60	1.25-1.55	0.42-1.40	0.08-0.12	15-35	13-33	6.1-7.3	6.0-8.9	0.0-0.5	.32	.20			
73165:																	
Knobby	0-3	55-80	10-30	10-18	1.30-1.50	4.00-14.00	0.05-0.10	10-20	6.0-15	6.6-8.4	0.1-2.9	2.0-4.0	.10	.20	1	8	0
	3-7	45-75	10-30	10-18	1.30-1.50	4.00-14.00	0.05-0.10	10-20	6.0-15	6.6-8.4	0.1-2.9	2.0-4.0	.10	.20			
	7-60	---	---	---	---	0.07-0.42	---	---	---	---	---	---	---	---			
Rock outcrop.																	
Bardley	0-4	5-15	55-70	18-27	1.40-1.55	4.00-14.00	0.12-0.17	20-30	15-25	4.5-6.5	0.1-2.9	2.0-4.0	.28	.37	2	8	0
	4-8	10-30	55-70	18-27	1.40-1.55	4.00-14.00	0.06-0.08	5.0-10	2.0-7.0	4.5-6.5	0.1-2.9	0.5-2.0	.28	.37			
	8-27	1-10	5-25	60-90	1.20-1.40	4.00-14.00	0.08-0.12	30-50	21-40	4.5-7.3	3.0-5.9	0.5-1.0	.24	.28			
	27-60	---	---	---	---	0.07-0.42	---	---	---	---	---	---	---	---			
73168:																	
Swiss	0-3	15-30	60-80	8-27	1.10-1.40	14.00-42.00	0.10-0.19	15-22	3.0-9.0	4.5-6.5	0.1-2.9	2.5-4.5	.32	.37	4	8	0
	3-9	20-40	45-65	7-27	1.10-1.45	14.00-42.00	0.10-0.19	5.0-12	2.0-7.0	4.5-6.5	0.1-2.9	0.5-1.2	.32	.37			
	9-40	10-30	25-45	40-65	1.40-1.55	0.14-0.42	0.08-0.10	20-26	13-20	3.5-7.3	6.0-8.9	0.2-0.8	.24	.32			
	40-80	15-45	20-45	27-65	1.50-1.90	0.14-0.42	0.05-0.10	6.0-12	4.0-11	5.1-6.5	3.0-5.9	0.1-0.2	.32	.32			
73192:																	
Beemont	0-6	15-40	55-75	8-27	1.30-1.40	14.00-42.00	0.14-0.18	3.0-12	2.0-10	4.5-6.5	0.0-2.9	0.5-2.0	.20	.32	3	8	0
	6-20	40-51	35-55	8-27	1.30-1.45	14.00-42.00	0.12-0.15	2.0-10	1.0-9.0	3.5-6.0	0.0-2.9	0.5-1.0	.15	.32			
	20-53	5-15	15-35	60-85	1.35-1.45	0.14-0.42	0.09-0.12	15-30	12-26	3.5-5.5	6.0-8.9	0.2-0.8	.32	.32			
	53-80	---	---	---	---	0.01-0.06	---	---	---	---	---	---	---	---			
73193, 73194:																	
Beemont	0-6	15-40	55-75	8-27	1.30-1.40	14.00-42.00	0.12-0.15	3.0-12	2.0-10	4.5-6.5	0.0-2.9	0.5-2.0	.15	.32	3	8	0
	6-20	40-51	35-55	8-27	1.30-1.45	14.00-42.00	0.12-0.15	2.0-10	1.0-9.0	3.5-6.0	0.0-2.9	0.5-1.0	.15	.32			
	20-53	5-15	15-35	60-85	1.35-1.45	0.14-0.42	0.09-0.12	15-30	12-26	3.5-5.5	6.0-8.9	0.2-0.8	.32	.32			
	53-80	---	---	---	---	0.01-0.06	---	---	---	---	---	---	---	---			

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
													Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	meq/100 g	meq/100 g	pH	Pct	Pct					
73195:																	
Useful	0-7	2-10	60-80	15-27	1.35-1.45	4.00-14.00	0.22-0.24	10-17	7.0-14	5.1-6.5	0.1-2.9	2.0-4.0	.37	.37	4	6	48
	7-31	2-10	45-65	35-45	1.25-1.35	4.00-14.00	0.11-0.18	18-23	15-20	4.5-6.0	6.0-8.9	0.5-1.0	.32	.32			
	31-45	2-10	35-55	40-60	1.25-1.55	1.40-4.00	0.05-0.12	18-30	15-27	4.5-7.8	6.0-8.9	0.1-0.5	.32	.32			
	45-53	5-20	40-60	35-60	1.25-1.50	1.40-4.00	0.05-0.12	18-30	15-27	4.5-7.8	6.0-8.9	0.1-0.5	.32	.43			
	53-60	---	---	---	---	0.07-0.42	---	---	---	---	---	---	---	---			
Moko	0-4	25-45	20-45	27-40	1.25-1.50	4.00-14.00	0.11-0.12	15-40	15-45	5.1-7.8	0.1-2.9	2.0-6.0	.24	.37	1	8	0
	4-7	25-45	25-55	18-35	1.25-1.60	4.00-14.00	0.03-0.14	15-40	15-40	6.1-7.8	0.1-2.9	2.0-6.0	.20	.37			
	7-60	---	---	---	---	0.00-1.40	---	---	---	---	---	---	---	---			
73196:																	
Mariosa	0-8	2-10	60-80	12-27	1.25-1.45	4.00-14.00	0.22-0.24	8.0-16	6.0-14	4.5-7.3	0.1-2.9	1.0-3.0	.43	.43	4	6	48
	8-24	2-10	40-65	35-60	1.30-1.50	0.01-0.42	0.09-0.20	18-34	12-28	4.5-6.5	6.0-8.9	0.5-1.0	.43	.43			
	24-80	5-15	50-65	18-40	1.50-1.70	0.14-0.42	0.08-0.16	9.0-26	6.0-23	4.5-6.5	3.0-5.9	0.1-0.5	.43	.43			
74633:																	
Hartville	0-7	3-10	65-85	12-27	1.10-1.30	4.00-14.00	0.22-0.24	10-16	9.0-15	4.5-7.3	0.1-2.9	1.0-3.0	.43	.43	5	6	48
	7-12	3-10	65-85	12-27	1.20-1.40	4.00-14.00	0.20-0.22	9.0-20	7.0-18	4.5-6.5	0.1-2.9	0.5-1.5	.43	.43			
	12-48	3-10	50-70	35-45	1.20-1.50	0.42-1.40	0.15-0.20	18-25	14-21	4.5-7.8	6.0-8.9	0.2-0.8	.32	.32			
	48-80	5-15	50-70	30-40	1.20-1.50	0.42-1.40	0.18-0.20	16-25	15-24	5.6-7.8	6.0-8.9	0.2-0.8	.32	.32			
74634:																	
Hartville	0-7	3-10	65-85	12-27	1.10-1.30	4.00-14.00	0.22-0.24	10-16	9.0-15	4.5-7.3	0.1-2.9	1.0-3.0	.43	.43	5	6	48
	7-12	3-10	65-85	12-27	1.20-1.40	4.00-14.00	0.20-0.22	9.0-20	7.0-18	4.5-6.5	0.1-2.9	0.5-1.5	.43	.43			
	12-48	3-10	50-70	35-45	1.20-1.50	0.42-1.40	0.15-0.20	18-25	14-21	4.5-7.8	6.0-8.9	0.2-0.8	.32	.32			
	48-80	5-15	35-70	30-50	1.20-1.50	0.42-1.40	0.18-0.20	16-25	15-24	5.6-7.8	6.0-8.9	0.2-0.8	.32	.32			
74656:																	
Deible	0-10	5-15	60-80	12-27	1.30-1.45	4.00-14.00	0.22-0.24	7.0-20	5.0-18	4.5-7.8	0.1-2.9	1.0-4.0	.43	.43	3	5	56
	10-15	5-15	60-80	12-27	1.30-1.45	4.00-14.00	0.20-0.22	7.0-20	5.0-17	4.5-7.8	0.1-2.9	0.5-2.0	.43	.43			
	15-37	2-10	35-55	40-80	1.35-1.50	0.14-0.42	0.08-0.12	20-35	14-30	4.5-7.8	6.0-8.9	0.1-1.0	.32	.32			
	37-80	5-20	45-65	27-60	1.35-1.50	1.40-4.00	0.08-0.11	10-20	9.0-16	5.1-7.8	6.0-8.9	0.1-0.5	.32	.32			
75376:																	
Cedargap	0-9	15-35	55-75	12-27	1.20-1.45	4.00-14.00	0.16-0.18	7.0-17	5.0-14	5.1-7.3	0.1-2.9	1.0-4.0	.24	.32	5	8	0
	9-18	40-65	20-55	12-35	1.30-1.50	4.00-14.00	0.08-0.10	10-20	7.0-15	5.1-7.3	0.1-2.9	0.5-2.0	.32	.43			
	18-49	18-55	20-55	15-35	1.30-1.50	4.00-14.00	0.08-0.10	10-20	7.0-15	5.1-7.3	0.1-2.9	0.5-1.0	.32	.43			
	49-60	15-50	15-45	30-80	1.20-1.40	1.40-4.00	0.04-0.10	18-40	15-36	5.6-7.3	6.0-8.9	0.5-1.0	.20	.32			
75389:																	
Hacreek	0-9	1-5	60-80	20-27	1.20-1.35	4.00-14.00	0.22-0.24	20-30	20-30	6.1-7.3	0.1-2.9	2.0-4.0	.32	.32	5	6	48
	9-21	1-5	50-70	30-36	1.30-1.50	1.40-4.00	0.18-0.20	25-35	25-35	6.1-7.8	3.0-5.9	1.0-2.0	.43	.43			
	21-28	1-5	50-70	30-35	1.30-1.50	1.40-4.00	0.18-0.20	20-30	20-30	6.1-7.8	3.0-5.9	0.1-1.0	.43	.43			
	28-70	1-5	50-70	30-35	1.30-1.50	1.40-4.00	0.16-0.20	20-30	20-30	6.1-7.8	3.0-5.9	0.1-1.0	.43	.43			
	70-81	1-5	50-70	28-35	1.35-1.55	1.40-4.00	0.16-0.18	20-30	20-30	6.1-7.8	3.0-5.9	0.1-1.0	.43	.43			

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
													Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	meq/100 g	meq/100 g	pH	Pct	Pct					
75395:																	
Jamesfin	0-10	2-5	65-80	10-27	1.20-1.40	4.00-14.00	0.22-0.24	6.0-20	4.0-18	5.6-7.8	0.1-2.9	2.0-4.0	.43	.43	5	5	56
	10-60	2-10	65-80	12-30	1.25-1.50	4.00-14.00	0.18-0.22	6.0-20	5.0-19	4.5-7.8	0.1-2.9	0.5-2.0	.43	.43			
75398:																	
Kaintuck	0-6	55-75	20-45	5-18	1.30-1.50	14.00-42.00	0.09-0.17	4.0-10	2.0-10	5.6-7.3	0.1-2.9	0.5-2.0	.24	.24	5	3	86
	6-80	40-90	10-55	5-18	1.20-1.50	14.00-42.00	0.06-0.20	5.0-8.0	2.0-8.0	5.6-7.8	0.1-2.9	0.1-1.0	.28	.28			
75399:																	
Jamesfin	0-10	2-5	65-80	10-27	1.20-1.40	4.00-14.00	0.22-0.24	6.0-20	4.0-18	5.6-7.8	0.1-2.9	2.0-4.0	.43	.43	5	5	56
	10-60	2-10	65-80	12-30	1.25-1.50	4.00-14.00	0.18-0.22	6.0-20	5.0-19	4.5-7.8	0.1-2.9	0.5-2.0	.43	.43			
75400:																	
Gladden	0-6	15-35	55-75	8-27	1.25-1.45	4.00-14.00	0.22-0.24	10-25	8.0-23	4.5-7.3	0.1-2.9	2.0-4.0	.32	.32	4	5	56
	6-38	15-40	45-75	10-18	1.25-1.45	4.00-14.00	0.17-0.20	8.0-20	7.0-19	4.5-7.3	0.1-2.9	0.1-1.0	.32	.32			
	38-60	50-95	4-30	5-18	1.20-1.50	14.00-42.00	0.02-0.05	3.0-12	3.0-12	4.5-7.3	0.1-2.9	0.1-1.0	.24	.32			
75408:																	
Secesh	0-6	10-30	60-80	10-27	1.10-1.30	4.00-14.00	0.20-0.22	8.0-12	6.0-10	5.6-6.8	0.1-2.9	1.0-3.0	.32	.32	5	5	56
	6-16	10-20	45-65	28-35	1.20-1.40	4.00-14.00	0.18-0.20	10-16	7.0-13	5.6-6.5	3.0-5.9	0.5-1.0	.32	.32			
	16-42	30-45	35-50	10-27	1.25-1.50	4.00-14.00	0.13-0.19	10-16	6.0-12	4.5-6.5	0.1-2.9	0.2-0.5	.20	.32			
	42-80	18-70	12-42	20-35	1.30-1.50	4.00-14.00	0.10-0.17	10-16	7.0-13	4.5-6.5	3.0-5.9	0.2-0.5	.10	.24			
99000.																	
Pits, quarries																	
99001.																	
Water																	

Table 19.--Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
64000:							
Racoon	C/D	Rare	Brief	Jan-Dec	0.0-1.0	Apparent	Nov-May
64001:							
Freeburg	C	Rare	Brief	Jan-Dec	1.0-2.5	Perched	Nov-May
66003:							
Jemerson	B	Rare	Brief	Jan-Dec	3.5-5.0	Apparent	Nov-Apr
66005:							
Deible	D	Rare	Brief	Jan-Dec	0.0-1.0	Perched	Nov-May
70028, 70029:							
Moko	D	None	---	---	>6.0	---	---
Rock outcrop.							
73012, 73035:							
Gravois	C	None	---	---	1.5-3.0	Perched	Nov-May
73088, 73089:							
Rueter	B	None	---	---	>6.0	---	---
73090, 73091:							
Useful	C	None	---	---	2.0-3.5	Perched	Nov-May
73092, 73093, 73094:							
Gatewood	C	None	---	---	1.5-3.0	Perched	Nov-May
73095:							
Gravois	C	None	---	---	1.5-3.0	Perched	Nov-May
73097:							
Swiss	C	None	---	---	2.0-3.0	Perched	Nov-Apr
73098:							
Plato	C	None	---	---	1.0-2.0	Perched	Nov-May
73106:							
Mariosa	D	None	---	---	0.0-1.0	Perched	Nov-May
73108:							
Gravois	C	None	---	---	1.5-3.0	Perched	Nov-May
Gatewood	C	None	---	---	1.5-3.0	Perched	Nov-May
73109:							
Alred	C	None	---	---	>6.0	---	---
73112:							
Gunlock	C	None	---	---	1.5-3.0	Perched	Nov-May
73135, 73136:							
Union	C	None	---	---	1.5-3.0	Perched	Nov-May
73158:							
Cotton	C	None	---	---	0.5-1.5	Perched	Nov-Apr

Table 19.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
73165:							
Knobby	D	None	---	---	>6.0	---	---
Rock outcrop.							
Bardley	B	None	---	---	>6.0	---	---
73168:							
Swiss	C	None	---	---	2.0-3.0	Perched	Nov-Apr
73192, 73193, 73194:							
Beemont	C	None	---	---	2.0-3.0	Perched	Nov-Apr
73195:							
Useful	C	None	---	---	2.0-3.5	Perched	Nov-May
Moko	D	None	---	---	>6.0	---	---
73196:							
Mariosa	D	None	---	---	0.0-1.0	Perched	Nov-May
74633, 74634:							
Hartville	C	None	---	---	1.0-2.0	Perched	Nov-May
74656:							
Deible	D	Rare	Brief	Jan-Dec	0.0-1.0	Perched	Nov-May
75376:							
Cedargap	B	Frequent	Very brief	Oct-Jun	3.5-6.0	Apparent	Nov-May
75389:							
Hacreek	B	Rare	Brief	Jan-Jun	1.0-2.0	Apparent	Nov-May
75395:							
Jamesfin	B	Occasional	Brief	Oct-Jun	4.0-6.0	Apparent	Nov-Apr
75398:							
Kaintuck	B	Frequent	Brief	Oct-Jun	>6.0	---	---
75399:							
Jamesfin	B	Frequent	Brief	Oct-Jun	4.0-6.0	Apparent	Nov-Apr
75400:							
Gladden	B	Frequent	Very brief	Oct-Jun	>6.0	---	---
75408:							
Secesh	B	Rare	Very brief	Jan-Dec	>6.0	---	---
99000. Pits, quarries							
99001. Water							

Table 20.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
64000:							
Racoon	---	---	---	---	Moderate	High	High
64001:							
Freeburg	---	---	---	---	Moderate	High	High
66003:							
Jemerson	---	---	---	---	Moderate	Moderate	Moderate
66005:							
Deible	Abrupt textural change	11-22	---	Noncemented	Moderate	High	High
70028, 70029:							
Moko	Bedrock (lithic)	4-20	---	Indurated	Moderate	Low	Low
Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	---
73012, 73035:							
Gravois	Dense material	18-40	10-35	Noncemented	Moderate	Moderate	High
73088, 73089:							
Rueter	---	---	---	---	Moderate	High	High
73090, 73091:							
Useful	Bedrock (lithic)	40-60	---	Indurated	Moderate	Moderate	Moderate
73092, 73093, 73094:							
Gatewood	Bedrock (lithic)	20-40	---	Indurated	Moderate	High	Moderate
73095:							
Gravois	Dense material	18-40	10-35	Noncemented	Moderate	Moderate	High
73097:							
Swiss	Dense material	40-80	0-40	Noncemented	Moderate	High	High
73098:							
Plato	Fragipan	20-36	8-28	Noncemented	Moderate	High	High
73106:							
Mariosa	Abrupt textural change	4-13	---	Noncemented	Moderate	High	High
	Dense material	20-40	40-60	Noncemented			
73108:							
Gravois	Dense material	18-40	10-35	Noncemented	Moderate	Moderate	High
Gatewood	Bedrock (lithic)	20-40	---	Indurated	Moderate	High	Moderate
73109:							
Alred	Strongly contrasting textures	15-39	41-65	Noncemented	Moderate	Moderate	Moderate
73112:							
Gunlock	Dense material	20-34	10-30	Noncemented	Moderate	Moderate	High

Table 20.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
73135, 73136:							
Union	Fragipan	18-36	9-25	Noncemented	Moderate	High	High
73158:							
Cotton	Dense material	20-40	10-32	Noncemented	Moderate	High	High
73165:							
Knobby	Bedrock (lithic)	4-20	---	Indurated	Low	Low	Low
Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	---
Bardley	Bedrock (lithic)	20-40	---	Indurated	Moderate	Moderate	Moderate
73168:							
Swiss	Dense material	40-80	0-40	Noncemented	Moderate	High	High
73192, 73193, 73194:							
Beemont	Bedrock (lithic)	40-60	---	Indurated	Moderate	High	High
73195:							
Useful	Bedrock (lithic)	40-60	---	Indurated	Moderate	Moderate	Moderate
Moko	Bedrock (lithic)	4-20	---	Indurated	Moderate	Low	Low
73196:							
Mariosa	Abrupt textural change	4-13	---	Noncemented	Moderate	High	High
	Dense material	20-40	40-60	Noncemented			
74633, 74634:							
Hartville	---	---	---	---	Moderate	Moderate	High
74656:							
Deible	Abrupt textural change	11-22	---	Noncemented	Moderate	High	High
75376:							
Cedargap	---	---	---	---	Moderate	Low	Moderate
75389:							
Hacreek	---	---	---	---	Moderate	High	Low
75395:							
Jamesfin	---	---	---	---	Moderate	Low	Moderate
75398:							
Kaintuck	---	---	---	---	Moderate	Low	Moderate
75399:							
Jamesfin	---	---	---	---	Moderate	Low	Moderate
75400:							
Gladden	---	---	---	---	Moderate	Moderate	High
75408:							
Secesh	---	---	---	---	Moderate	Low	Moderate
99000.							
Pits, quarries							
99001.							
Water							

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

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

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

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, 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-silty, mixed, superactive, mesic Typic Hapludalfs.

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

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff, 1999) and in "Keys to Soil Taxonomy" (Soil Survey Staff, 1998). 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.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alred Series

Depth class: Very deep
Drainage class: Well drained
Landform: Upland
Parent material: Gravelly colluvium over clayey residuum derived from dolostone
Slope range: 15 to 35 percent

Taxonomic classification: Loamy-skeletal over clayey, siliceous, semiactive, mesic Typic Paleudalfs

Typical Pedon

Alred gravelly silt loam, 15 to 35 percent slopes, stony; UTM—Zone 15, Easting 597165, Northing 4237730.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly silt loam; weak very fine granular structure; friable; many very fine, fine, and medium roots; common very fine, fine, and medium vesicular pores with moderate vertical continuity; common fine distinct brown (10YR 5/3) irregular masses of iron accumulation; 25 percent subrounded chert gravel and 5 percent subrounded chert cobbles; strongly acid; clear smooth boundary.

E1—3 to 12 inches; brown (10YR 5/3) gravelly silt loam; weak very fine granular structure; friable; many medium and common very fine, fine, and coarse roots; common very fine vesicular pores with moderate vertical continuity; 25 percent subrounded chert gravel and 5 percent subrounded chert cobbles; very strongly acid; clear wavy boundary.

E2—12 to 20 inches; yellowish brown (10YR 5/4) gravelly silt loam; moderate fine granular structure; friable; many medium and common very fine, fine, and coarse roots; common very fine, fine, and medium vesicular pores with moderate vertical continuity; few prominent discontinuous dark reddish brown (5YR 2.5/2) manganese or iron-manganese stains on faces of peds; common fine distinct yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) irregular masses of iron accumulation; 20 percent subrounded chert gravel and 8 percent subrounded chert cobbles; very strongly acid; clear wavy boundary.

Bt1—20 to 28 inches; yellowish brown (10YR 5/6) very gravelly silt loam; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; common very fine, fine, and medium roots; few very fine vesicular pores with moderate vertical continuity; few distinct discontinuous clay films on faces of peds; common fine distinct yellowish brown (10YR 5/4) irregular masses of iron accumulation; 25 percent subrounded chert gravel and 10 percent subrounded chert cobbles; very strongly acid; clear wavy boundary.

Bt2—28 to 35 inches; strong brown (7.5YR 5/6) very gravelly clay loam; moderate fine angular blocky structure; firm; common very fine, fine, and medium roots; few very fine, fine, and medium vesicular pores with moderate vertical continuity; few distinct discontinuous clay films on faces of peds; few distinct discontinuous silt coats on faces of peds; common fine faint strong brown (7.5YR 4/6) irregular masses of iron accumulation; 40 percent angular chert gravel and 10 percent angular chert cobbles; very strongly acid; clear wavy boundary.

2Bt3—35 to 45 inches; yellowish brown (10YR 5/4) clay; moderate fine prismatic structure parting to weak fine angular blocky; firm; common very fine, fine, and medium roots; few very fine vesicular pores with low vertical continuity; common distinct discontinuous clay films on faces of peds; common fine prominent red (2.5YR 4/6) and strong brown (7.5YR 4/6) irregular masses of iron accumulation; 5 percent subrounded chert gravel and 5 percent subrounded chert cobbles; very strongly acid; gradual smooth boundary.

2Bt4—45 to 55 inches; yellowish brown (10YR 5/6) clay; moderate medium prismatic structure parting to weak fine angular blocky; firm; common very fine, fine, and medium roots; few very fine vesicular pores with low vertical continuity; common prominent continuous grayish brown (10YR 5/2) clay films on vertical faces of peds and common distinct discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; many fine prominent red (2.5YR 4/6) and common fine distinct strong brown (7.5YR 4/6) irregular masses of iron accumulation; very strongly acid; clear wavy boundary.

2Bt5—55 to 62 inches; 50 percent strong brown (7.5YR 5/6) and 50 percent reddish brown (5YR 4/4) clay; moderate medium prismatic structure parting to moderate fine angular blocky; firm; common very fine, fine, and medium roots; few very fine vesicular pores with low vertical continuity; common prominent continuous brown (10YR 4/3) clay films on faces of peds; common fine prominent red (2.5YR 4/6) irregular masses of iron accumulation; 10 percent angular chert gravel; slightly acid; gradual wavy boundary.

2Bt6—62 to 72 inches; brown (10YR 5/3) clay; moderate fine prismatic structure; firm; common very fine and fine roots; few very fine vesicular pores with low vertical continuity; common distinct continuous clay films on faces of peds; few prominent discontinuous dark reddish brown (5YR 2.5/2) manganese or iron-manganese stains on faces of peds; common medium prominent reddish brown (5YR 4/4), common fine prominent strong brown (7.5YR 5/6), and common fine prominent red (2.5YR 4/6) irregular masses of iron

accumulation; 5 percent subrounded chert cobbles; neutral; abrupt wavy boundary.
2R—72 inches; dolostone.

Range in Characteristics

A horizon:
Value—3 to 5
Chroma—2 or 3

E horizon:
Value—5 or 6
Chroma—3 or 4
Texture—gravelly, very gravelly, or cobbly silt loam or loam

EB horizon (where present):
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—very gravelly silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 or 6
Texture—very gravelly or very cobbly silt loam, loam, or clay loam

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—4 or 5
Chroma—3, 4, or 6
Texture—clay or very cobbly clay

Bardley Series

Depth class: Moderately deep
Drainage class: Well drained
Landform: Upland
Parent material: Gravelly colluvium over clayey residuum derived from dolostone
Slope range: 35 to 75 percent

Taxonomic classification: Very fine, mixed, active, mesic Typic Hapludalfs

Typical Pedon

Bardley very gravelly silt loam, in an area of Knobby-Rock outcrop-Bardley complex, 35 to 75 percent slopes, extremely stony; UTM—Zone 15, Easting 595480, Northing 4227230.

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) very gravelly silt loam, grayish brown (10YR 5/2) dry; weak very fine and fine subangular blocky structure; friable; many very fine and fine and common medium roots; 50 percent chert gravel and 3 percent sandstone gravel; moderately acid; clear wavy boundary.
A2—1 to 5 inches; dark grayish brown (10YR 4/2) very gravelly silt loam; weak very fine and fine subangular blocky structure; friable; common very fine, fine, and medium roots; 50 percent chert gravel and 5 percent sandstone gravel; moderately acid; gradual wavy boundary.
BE—5 to 9 inches; brown (10YR 4/3) extremely gravelly loam; weak fine subangular blocky structure; friable; common fine and medium roots; 55 percent chert gravel, 5 percent sandstone gravel, and 5 percent chert cobbles; moderately acid; clear wavy boundary.
2Bt1—9 to 14 inches; yellowish red (5YR 4/6) gravelly clay; weak fine prismatic structure; firm; common very fine and fine roots; 20 percent chert gravel and 5 percent chert cobbles; strongly acid; clear wavy boundary.
2Bt2—14 to 17 inches; reddish brown (5YR 5/4) gravelly clay; weak fine and medium prismatic structure; firm; common very fine roots; few prominent black (10YR 2/1) manganese or iron-manganese stains on faces of peds; 25 percent chert gravel and 5 percent chert cobbles; moderately acid; clear wavy boundary.
2Bt3—17 to 26 inches; yellowish red (5YR 4/6) gravelly clay; moderate medium prismatic structure; firm; common very fine, fine, medium, and coarse roots; many prominent black (10YR 2/1) manganese or iron-manganese stains on faces of peds; 20 percent chert gravel and 3 percent chert cobbles; moderately acid; gradual wavy boundary.
2Bt4—26 to 33 inches; reddish brown (5YR 4/4) gravelly clay; moderate fine and medium prismatic structure; firm; common very fine, fine, medium, and coarse roots; 25 percent chert gravel and 5 percent chert cobbles; slightly acid; clear wavy boundary.
2R—33 inches; unweathered dolostone bedrock.

Range in Characteristics

A horizon:
Value—3 or 4
Chroma—2 or 3
Texture—very gravelly or extremely gravelly silt loam

E horizon (where present) and BE horizon:
Value—4 to 6
Chroma—3 or 4
Texture—very gravelly or extremely gravelly silt loam or loam

2Bt horizon:
Hue—2.5YR or 5YR
Value—3 to 5
Chroma—3, 4, or 6
Texture—clay, gravelly clay, or very gravelly clay

Beemont Series

Depth class: Deep
Drainage class: Moderately well drained
Landform: Upland
Parent material: Gravelly colluvium over clayey residuum derived from dolostone
Slope range: 3 to 35 percent

Taxonomic classification: Very fine, smectitic, mesic Oxyaquic Hapludalfs

Typical Pedon

Beemont very gravelly silt loam, 8 to 15 percent slopes, stony; UTM—Zone 15, Easting 574470, Northing 4210310.

A—0 to 6 inches; brown (10YR 5/3) very gravelly silt loam; moderate fine granular structure; friable; many very fine, fine, and medium roots; common very fine and fine vesicular pores; 30 percent subangular chert gravel and 10 percent subangular chert cobbles; strongly acid; clear smooth boundary.

E1—6 to 13 inches; pale brown (10YR 6/3) very gravelly loam; moderate fine granular structure; friable; common very fine, fine, medium, and coarse roots; common very fine and fine vesicular pores; 50 percent subangular chert gravel and 5 percent subangular chert cobbles; strongly acid; clear smooth boundary.

E2—13 to 20 inches; light yellowish brown (10YR 6/4) very gravelly loam; moderate fine granular structure; friable; common very fine, fine, and medium roots; common very fine and fine vesicular pores; 45 percent subangular chert gravel and 5 percent subangular chert cobbles; strongly acid; clear smooth boundary.

2Bt1—20 to 26 inches; yellowish red (5YR 4/6) clay; weak fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine, fine, and medium roots; few fine vesicular pores; many distinct discontinuous clay films on faces of peds; common fine irregular strong brown (7.5YR 5/6) masses of iron accumulation; 5 percent subangular chert gravel; very strongly acid; clear smooth boundary.

2Bt2—26 to 34 inches; 50 percent yellowish brown (10YR 5/6) and 50 percent yellowish red (5YR 5/6) clay; weak medium prismatic structure parting to moderate fine subangular blocky; firm; common very fine, fine, and medium roots; few very fine vesicular pores; common distinct discontinuous clay films on faces of peds; 1 percent subangular chert gravel and 5 percent subangular sandstone gravel; very strongly acid; clear smooth boundary.

2Bt3—34 to 39 inches; brownish yellow (10YR 6/6) cobbly clay; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common very fine, fine, medium, and coarse roots; few very fine vesicular pores; common distinct discontinuous clay films on faces of peds; common fine prominent very pale brown (10YR 8/2) irregular iron depletions; common fine irregular yellowish red (5YR 5/6) masses of iron accumulation; 10 percent subangular chert gravel and 10 percent subangular chert cobbles; very strongly acid; clear smooth boundary.

2Bt4—39 to 44 inches; brownish yellow (10YR 6/6) cobbly clay; weak fine prismatic structure parting to moderate medium angular blocky; firm; common very fine and fine roots; few very fine vesicular pores; common distinct discontinuous clay films on faces of peds; common fine irregular strong brown (7.5YR 5/8) and pale brown (10YR 6/3) masses of iron accumulation; 10 percent angular chert gravel and 10 percent subangular chert cobbles; very strongly acid; clear wavy boundary.

2Bt5—44 to 53 inches; 60 percent yellowish brown (10YR 5/8) and 40 percent pale brown (10YR 6/3) clay; weak fine prismatic structure parting to weak medium angular blocky; firm; common very fine, fine, and medium roots; few very fine vesicular pores; few distinct discontinuous clay films on faces of peds; common fine prominent light brownish gray (10YR 6/2) irregular iron depletions; few fine irregular black (5YR 2.5/1) soft iron-manganese concretions; 2 percent angular chert gravel; strongly acid; abrupt irregular boundary.

2R—53 inches; dolostone.

Range in Characteristics

A horizon:
Value—3 to 5
Chroma—2 or 3
Texture—gravelly or very gravelly silt loam

E horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—2, 3, or 4
Texture—gravelly or very gravelly silt loam or loam

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3, 4, 6, or 8
Texture—clay, gravelly clay, or cobbly clay

Cedargap Series

Depth class: Very deep
Drainage class: Well drained
Landform: Flood plain
Parent material: Gravelly alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Cumulic Hapludolls

Typical Pedon

Cedargap gravelly silt loam, 0 to 3 percent slopes, frequently flooded; UTM—Zone 15, Easting 611230, Northing 4213450.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very fine and fine and common medium roots; 15 percent subangular chert gravel and 5 percent subangular chert cobbles; moderately acid; clear smooth boundary.

A1—9 to 19 inches; very dark grayish brown (10YR 3/2) extremely gravelly sandy clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; many very fine and fine roots; 50 percent subangular chert gravel and 10 percent subangular chert cobbles; moderately acid; clear smooth boundary.

A2—19 to 31 inches; very dark grayish brown (10YR 3/2) extremely gravelly coarse sandy loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; common very fine and fine roots; 50 percent subangular chert gravel and 10 percent subangular chert cobbles; slightly acid; gradual smooth boundary.

Bw1—31 to 39 inches; brown (10YR 4/3) extremely gravelly coarse sandy loam; weak fine subangular blocky structure; friable; common very fine and fine roots; 55 percent subangular chert gravel and 5 percent subangular chert cobbles; neutral; clear smooth boundary.

Bw2—39 to 43 inches; brown (10YR 5/3) extremely gravelly coarse sandy loam; weak fine subangular blocky structure; friable; common very fine and fine roots; common fine rounded black (7.5YR 2.5/1) soft nodules; common fine irregular dark yellowish brown (10YR 4/4) masses of iron accumulation; 60 percent subangular chert gravel; neutral; clear smooth boundary.

Bw3—43 to 48 inches; brown (10YR 5/3) gravelly coarse sandy loam; weak fine subangular blocky structure; friable; few very fine and fine roots; common fine faint grayish brown (10YR 5/2) irregular iron depletions between peds; common fine rounded black (7.5YR 2.5/1) soft nodules; many fine irregular yellowish brown (10YR 5/8) masses of iron accumulation; 25 percent subangular chert gravel; neutral; clear smooth boundary.

2Bw4—48 to 55 inches; yellowish brown (10YR 5/8) gravelly clay; moderate fine subangular blocky structure; firm; many medium prominent light gray (10YR 7/1) irregular iron depletions between peds; 25 percent subangular chert gravel and 5 percent subangular chert cobbles; neutral; clear smooth boundary.

2Bw5—55 to 80 inches; 75 percent yellowish brown (10YR 5/8) and 25 percent light gray (10YR 7/1) clay; moderate medium prismatic structure parting to moderate fine angular blocky; firm; 5 percent subangular chert gravel; neutral.

Range in Characteristics

Ap and A horizons:
Value—2 or 3
Texture—gravelly, very gravelly, or extremely gravelly silt loam, sandy clay loam, or coarse sandy loam

Bw horizon:
Value—3 to 5
Texture—gravelly, very gravelly, or extremely gravelly loam, clay loam, sandy clay loam, or coarse sandy loam

2Bw horizon:
Value—5 to 7
Chroma—1, 2, 3, 4, 6, or 8
Texture—clay, gravelly clay, or very gravelly clay

Cotton Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landform: Footslope
Parent material: Loess over residuum derived from cherty dolostone
Slope range: 3 to 8 percent

Taxonomic classification: Fine, smectitic, mesic Fragiaquic Hapludalfs

Typical Pedon

Cotton silt loam, 3 to 8 percent slopes, footslopes; UTM—Zone 15, Easting 588910, Northing 4230840.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; very friable; many very fine, fine, and medium roots; common very fine and fine vesicular pores; strongly acid; clear smooth boundary.

Bt1—7 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak very fine subangular blocky structure; friable; many very fine and fine roots; common very fine and fine vesicular pores; common distinct discontinuous clay films on faces of peds; common fine distinct dark grayish brown (10YR 4/2) irregular iron depletions; common fine irregular yellowish brown (10YR 5/6) masses of iron accumulation; moderately acid; clear smooth boundary.

Bt2—11 to 19 inches; brown (10YR 5/3) silty clay; weak fine prismatic structure parting to weak fine subangular blocky; firm; common very fine and fine roots; common very fine vesicular pores; many distinct discontinuous clay films on faces of peds; common fine faint grayish brown (10YR 5/2) irregular iron depletions; common fine irregular strong brown (7.5YR 4/6) masses of iron accumulation; very strongly acid; clear smooth boundary.

Btg—19 to 26 inches; grayish brown (10YR 5/2) silty clay; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine and fine roots; common very fine and fine vesicular pores; many distinct continuous clay films on faces of peds; many fine irregular dark yellowish brown (10YR 4/6) masses of iron accumulation; very strongly acid; clear smooth boundary.

2Btx1—26 to 32 inches; 65 percent dark yellowish brown (10YR 4/4) and 35 percent grayish brown (10YR 5/2) silty clay loam; strong medium prismatic structure parting to moderate medium subangular blocky; very firm; 40 percent brittleness; few very fine and fine roots between peds; common very fine and fine vesicular pores; many prominent continuous brown (10YR 5/3) clay films on vertical faces of peds and common distinct discontinuous clay films on faces of peds; strongly acid; gradual smooth boundary.

2Btx2—32 to 55 inches; light yellowish brown (10YR 6/4) silt loam; strong very coarse prismatic structure; extremely firm; 50 percent brittleness; few very fine roots between peds; many very fine, fine, and medium vesicular pores; few distinct continuous grayish brown (10YR 5/2) clay films on vertical faces of peds; common medium distinct grayish brown (10YR 5/2) threadlike iron depletions between peds; common fine irregular black (7.5YR 2.5/1) masses of iron-manganese accumulation between peds; 2 percent subangular chert gravel; slightly acid; gradual wavy boundary.

3Bt1—55 to 72 inches; dark yellowish brown (10YR 4/6) silty clay; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine vesicular pores; many prominent continuous clay films on faces of peds; few prominent discontinuous black (7.5YR 2.5/1) manganese or iron-manganese stains on faces of peds; few fine irregular strong brown (7.5YR 5/8) masses of iron accumulation; 5 percent angular chert gravel; neutral; gradual smooth boundary.

3Bt2—72 to 80 inches; 60 percent grayish brown (10YR 5/2) and 40 percent yellowish brown (10YR 5/6) gravelly clay; moderate medium angular blocky structure; firm; few very fine vesicular pores; many prominent continuous clay films on faces of peds; very few distinct discontinuous black (7.5YR 2.5/1) manganese or iron-manganese stains on faces of peds; few fine rounded black (7.5YR 2.5/1) iron-manganese concretions; 20 percent angular chert gravel; neutral.

Range in Characteristics

Ap horizon:
- Value—4 or 5
- Chroma—2 or 3

Bt horizon:
- Hue—7.5YR or 10YR
- Value—4 or 5
- Chroma—2, 3, 4, or 6
- Texture—silt loam, silty clay loam, or silty clay

Btg horizon:
- Hue—7.5YR or 10YR
- Value—4 or 5

2Btx horizon:
- Value—4 to 6
- Chroma—2 , 3, or 4
- Texture—silt loam, silty clay loam, or the gravelly or very gravelly analogs of these textures

3Bt horizon:
- Hue—5YR, 7.5YR, or 10YR
- Value—4 or 5
- Chroma—2, 3, 4, or 6
- Texture—silty clay loam, silty clay, clay, or the gravelly analogs of these textures

Deible Series

Depth class: Very deep
Drainage class: Poorly drained
Landform: Stream terrace
Parent material: Alluvium and colluvium
Slope range: 0 to 5 percent

Taxonomic classification: Fine, mixed, active, mesic Typic Albaqualfs

Typical Pedon

Deible silt loam, 0 to 2 percent slopes, rarely flooded; UTM—Zone 15, Easting 605210, Northing 4252130.

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak very thin platy structure; friable; common very fine roots; neutral; abrupt smooth boundary.

E—7 to 11 inches; light brownish gray (10YR 6/2) silt loam; weak thin platy structure parting to weak very fine subangular blocky; friable; common very fine roots; common faint discontinuous organic coats on faces of peds; common distinct discontinuous silt coats on faces of peds; few fine iron-manganese concretions; slightly acid; clear smooth boundary.

Btg1—11 to 16 inches; grayish brown (10YR 5/2) silty clay loam; moderate very fine subangular blocky structure; firm; common very fine roots; common distinct discontinuous clay films on faces of peds; few fine iron-manganese concretions; few fine yellowish brown (10YR 5/6) masses of iron accumulation; moderately acid; gradual smooth boundary.

Btg2—16 to 24 inches; 85 percent grayish brown (10YR 5/2) and 15 percent gray (10YR 5/1) silty clay; moderate fine subangular blocky structure; firm; common very fine roots; many prominent continuous clay films on faces of peds; few fine iron-manganese concretions; common fine yellowish brown (10YR 5/4) masses of iron accumulation; neutral; gradual smooth boundary.

Btg3—24 to 34 inches; grayish brown (2.5Y 5/2) silty clay; moderate medium prismatic structure; firm; common very fine roots; many prominent continuous clay films on faces of peds; common fine iron-manganese concretions; common fine yellowish brown (10YR 5/6) masses of iron accumulation; slightly alkaline; gradual smooth boundary.

Btg4—34 to 41 inches; grayish brown (2.5Y 5/2) silty clay; moderate medium subangular blocky structure; firm; common prominent discontinuous clay films on faces of peds; common fine iron-manganese concretions; common fine yellowish brown (10YR 5/6) masses of iron accumulation; slightly alkaline; clear smooth boundary.

Btg5—41 to 52 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; firm; common prominent discontinuous clay films on faces of peds; common fine iron-manganese concretions; common fine yellowish brown (10YR 5/6) and few fine brownish yellow (10YR 6/8) masses of iron accumulation; slightly alkaline; clear smooth boundary.

Btg6—52 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium subangular blocky structure; firm; common distinct discontinuous clay films on faces of peds; few fine iron-manganese concretions; few fine brownish yellow (10YR 6/6) masses of iron accumulation; slightly alkaline.

Range in Characteristics

Ap horizon:
Value—4 or 5

E horizon:
Value—5 or 6

Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay or silty clay loam

2Btg horizon (where present):
Hue—10YR
Value—5 or 6
Chroma—2
Texture—silty clay loam

Freeburg Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landform: Stream terrace
Parent material: Fine-silty alluvium
Slope range: 0 to 3 percent

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

Typical Pedon

Freeburg silt loam, 0 to 3 percent slopes, rarely flooded; UTM—Zone 15, Easting 614460, Northing 4229960.

Ap—0 to 10 inches; grayish brown (10YR 5/2) silt loam; moderate very fine granular structure; very friable; many very fine, fine, and medium roots; common

fine vesicular pores with low vertical continuity; slightly acid; clear smooth boundary.
E—10 to 14 inches; 55 percent brown (10YR 5/3) and 45 percent grayish brown (10YR 5/2) silt loam; moderate very fine granular structure; very friable; many very fine, fine, and medium roots; common fine vesicular pores with low vertical continuity; slightly acid; clear smooth boundary.
Bt—14 to 30 inches; 55 percent brown (10YR 5/3) and 45 percent grayish brown (10YR 5/2) silt loam; weak very fine subangular blocky structure; firm; common very fine and fine roots; common fine vesicular pores with low vertical continuity; very few distinct continuous clay films on faces of peds; moderately acid; gradual smooth boundary.
Btg1—30 to 48 inches; 60 percent light brownish gray (10YR 6/2) and 40 percent brown (10YR 5/3) silt loam; weak very fine subangular blocky structure; firm; few very fine roots; many fine vesicular pores with low vertical continuity; very few distinct continuous clay films on faces of peds; strongly acid; gradual smooth boundary.
Btg2—48 to 68 inches; 70 percent light brownish gray (10YR 6/2) and 30 percent brown (10YR 4/3) silt loam; weak very fine subangular blocky structure; firm; few very fine roots; common fine vesicular pores with low vertical continuity; very few faint continuous clay films on faces of peds; strongly acid; clear smooth boundary.
Btg3—68 to 80 inches; 70 percent light brownish gray (10YR 6/2) and 30 percent dark yellowish brown (10YR 4/4) silt loam; weak very fine subangular blocky structure; firm; few very fine roots; common fine vesicular pores with low vertical continuity; very few faint continuous clay films on faces of peds; common fine and medium irregular yellowish brown (10YR 5/6) masses of iron accumulation; strongly acid.

Range in Characteristics

Ap horizon:
Value—4 or 5

E horizon:
Value—5 or 6
Chroma—2 or 3

Bt and Btg horizons:
Value—4 to 6
Chroma—2 , 3, or 4
Texture—silt loam or silty clay loam

Gatewood Series

Depth class: Moderately deep
Drainage class: Moderately well drained
Landform: Upland
Parent material: Clayey residuum derived from dolostone
Slope range: 3 to 35 percent

Taxonomic classification: Very fine, mixed, active, mesic Oxyaquic Hapludalfs

Typical Pedon

Gatewood very gravelly silt loam, 15 to 35 percent slopes, stony; UTM—Zone 15, Easting 605520, Northing 4214170.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; very friable; many very fine, fine, medium, and coarse roots; common very fine vesicular pores; 45 percent subangular chert gravel and 10 percent subangular chert cobbles; strongly acid; clear smooth boundary.
E—4 to 12 inches; brown (10YR 5/3) very gravelly silt loam; moderate fine granular structure; friable; many very fine, fine, medium, and coarse roots; common very fine vesicular pores; 50 percent subangular chert gravel and 5 percent subangular chert cobbles; moderately acid; clear smooth boundary.
2Bt1—12 to 20 inches; yellowish brown (10YR 5/6) clay; moderate fine subangular blocky structure; firm; common very fine, fine, medium, and coarse roots; few very fine and fine vesicular pores; many distinct continuous yellowish brown (10YR 5/4) clay films on faces of peds; very few prominent discontinuous black (10YR 2/1) iron stains in root channels and/or pores; 5 percent subangular chert gravel; strongly acid; clear smooth boundary.
2Bt2—20 to 24 inches; yellowish brown (10YR 5/6) gravelly clay; moderate fine subangular blocky structure; firm; common very fine, fine, medium, and coarse roots; few very fine and fine vesicular pores; many distinct continuous yellowish brown (10YR 5/4) clay films on faces of peds; very few prominent discontinuous black (10YR 2/1) iron stains in root channels and/or pores; common fine prominent pale brown (10YR 6/3) irregular iron accumulations between peds; 30 percent rounded dolostone gravel; slightly alkaline; abrupt irregular boundary.
2R—24 inches; dolostone.

Range in Characteristics

A horizon:
Value—3 to 5
Chroma—2 or 3

E horizon:
Hue—10YR
Value—4 to 6
Chroma—3 or 4
Texture—gravelly, very gravelly, or extremely gravelly silt loam or loam

2Bt horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—2, 3, 4, 6, or 8
Texture—clay or gravelly clay

2Cr horizon (where present):
Hue—2.5Y
Value—6 or 7
Chroma—2
Texture—clay

Gladden Series

Depth class: Very deep
Drainage class: Well drained
Landform: Flood plain
Parent material: Coarse-loamy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy, siliceous, superactive, mesic Dystric Fluventic Eutrudepts

Typical Pedon

Gladden silt loam, 0 to 3 percent slopes, frequently flooded; UTM—Zone 15, Easting 598915, Northing 4265330.

Ap—0 to 6 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; many very fine roots; slightly acid; clear smooth boundary.
A—6 to 21 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; common very fine roots; neutral; gradual smooth boundary.
Bw1—21 to 30 inches; yellowish brown (10YR 5/4) silt loam; weak very fine subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.
Bw2—30 to 38 inches; brown (10YR 4/3) silt loam; weak very fine subangular blocky structure; friable; few very fine roots; neutral; clear wavy boundary.
2C—38 to 62 inches; dark yellowish brown (10YR 3/4) extremely gravelly sand; single grained; loose; 75 percent subrounded chert gravel; neutral.

Range in Characteristics

Ap and A horizons:
Value—3 or 4
Chroma—2 or 3

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 6
Chroma—3, 4, or 6
Texture—loam, sandy loam, or silt loam

2C horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—2 , 3, or 4
Texture—gravelly, very gravelly, or extremely gravelly analogs of silt loam to coarse sand

Gravois Series

Depth class: Very deep
Drainage class: Moderately well drained
Landform: Upland
Parent material: Fine-silty loess over gravelly residuum derived from dolostone
Slope range: 3 to 20 percent

Taxonomic classification: Fine-silty, mixed, active, mesic Aquic Paleudalfs

Typical Pedon

Gravois silt loam, 8 to 15 percent slopes; UTM—Zone 15, Easting 591644, Northing 4234736.

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many very fine and fine and common medium roots; common very fine and fine vesicular pores with low vertical continuity; moderately acid; clear smooth boundary.
BE—5 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; firm; common very fine and fine roots; common very fine and fine vesicular pores with low vertical continuity; moderately acid; clear smooth boundary.
Bt—10 to 19 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine and fine roots; few fine vesicular pores with low vertical continuity; common distinct discontinuous clay films on faces of peds; few fine distinct brown (10YR 5/3) irregular masses of iron accumulation; 2 percent angular chert gravel; strongly acid; gradual smooth boundary.

2Btx1—19 to 26 inches; light yellowish brown (10YR 6/4) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; firm; 35 percent brittleness; common very fine and fine roots; many very fine vesicular pores with moderate vertical continuity; common distinct continuous clay films on faces of peds; common prominent discontinuous very dusky red (2.5YR 2.5/2) manganese or iron-manganese stains on faces of peds; many medium prominent yellowish red (5YR 4/6) irregular masses of iron accumulation; 5 percent angular chert gravel; strongly acid; gradual smooth boundary.

2Btx2—26 to 34 inches; light brownish gray (10YR 6/2) silty clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; firm; 35 percent brittleness; common very fine and few fine roots; many very fine vesicular pores with moderate vertical continuity; common prominent continuous clay films on faces of peds; common prominent discontinuous very dusky red (2.5YR 2.5/2) manganese or iron-manganese stains on faces of peds; many medium prominent strong brown (7.5YR 5/6) and common fine prominent yellowish red (5YR 4/6) irregular masses of iron accumulation; 10 percent angular chert gravel; strongly acid; clear wavy boundary.

3Bt1—34 to 42 inches; 50 percent brown (10YR 5/3) and 50 percent strong brown (7.5YR 4/6) very gravelly clay; moderate medium prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; few very fine and fine vesicular pores with low vertical continuity; common distinct discontinuous clay films on faces of peds; common fine distinct light brownish gray (10YR 6/2) irregular iron depletions; common prominent discontinuous very dusky red (2.5YR 2.5/2) manganese or iron-manganese stains on faces of peds; 50 percent angular chert gravel and 5 percent subangular chert gravel; strongly acid; clear wavy boundary.

3Bt2—42 to 51 inches; 60 percent yellowish brown (10YR 5/4) and 40 percent reddish brown (5YR 5/4) very gravelly clay; weak fine angular blocky structure; firm; few very fine vesicular pores with low vertical continuity; common distinct discontinuous clay films on faces of peds; common prominent discontinuous very dusky red (2.5YR 2.5/2) manganese or iron-manganese stains on faces of peds; 50 percent angular chert gravel; neutral; clear wavy boundary.

3Bt3—51 to 60 inches; yellowish brown (10YR 5/6) clay; moderate fine prismatic structure parting to weak fine angular blocky; firm; few very fine vesicular pores with low vertical continuity; common distinct continuous clay films on faces of peds; common prominent discontinuous very dusky red (2.5YR 2.5/2) manganese or iron-manganese stains on faces of peds; common fine faint strong brown (7.5YR 5/6) irregular masses of iron accumulation; 5 percent angular chert gravel; neutral; clear wavy boundary.

3Bt4—60 to 73 inches; brownish yellow (10YR 6/8) extremely gravelly clay; weak fine angular blocky structure; firm; few very fine vesicular pores with low vertical continuity; common distinct discontinuous clay films on faces of peds; common prominent discontinuous very dusky red (2.5YR 2.5/2) manganese or iron-manganese stains on faces of peds; common medium prominent light yellowish brown (10YR 6/4) irregular masses of iron accumulation; 55 percent angular chert gravel and 25 percent angular chert cobbles; neutral; abrupt irregular boundary.

3R—73 inches; dolostone.

Range in Characteristics

Ap horizon:

Value—3 or 4
Chroma—2 or 3

E (where present) and BE horizon:

Value—4 to 6
Chroma—3 or 4

Bt horizon:

Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2, 3, 4, or 6
Texture—silt loam or silty clay loam

2Btx horizon:

Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2, 3, 4, or 6
Texture—loam, silt loam, silty clay loam, or the gravelly, very gravelly, or extremely gravelly analogs of these textures

3Bt horizon:

Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—2, 3, 4, 6, or 8
Texture—silty clay loam, silty clay, clay, or the gravelly, very gravelly, or extremely gravelly analogs of these textures

Gunlock Series

Depth class: Very deep
Drainage class: Moderately well drained
Landform: Upland
Parent material: Clayey loess over gravelly residuum derived from dolostone
Slope range: 3 to 8 percent

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

Typical Pedon

Gunlock silt loam, 3 to 8 percent slopes; UTM—Zone 15, Easting 583760, Northing 4216450.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak thin platy structure parting to moderate fine granular; friable; many very fine and fine roots; common very fine and fine vesicular pores; moderately acid; clear smooth boundary.

Bt1—7 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; many very fine, fine, and medium roots between peds; common very fine vesicular pores; few distinct discontinuous clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—12 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; many very fine, fine, and medium roots between peds; common very fine vesicular pores; many distinct continuous yellowish brown (10YR 5/4) clay films on faces of peds; common fine irregular yellowish red (5YR 4/6) masses of iron accumulation; 1 percent subangular chert gravel; strongly acid; clear smooth boundary.

2Btx—21 to 31 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; 35 percent brittleness; common very fine, fine, and medium roots between peds; common very fine vesicular pores; many distinct continuous brown (10YR 5/3) clay films on faces of peds; very few prominent discontinuous black (7.5YR 2.5/1) manganese or iron-manganese stains on faces of peds; many fine irregular strong brown (7.5YR 4/6) masses of iron accumulation; 5 percent subangular chert gravel; strongly acid; clear smooth boundary.

3Bt1—31 to 38 inches; pale brown (10YR 6/3) silty clay; weak medium prismatic structure parting to weak fine subangular blocky; very firm; 25 percent brittleness; common very fine roots between peds; common very fine vesicular pores; common distinct discontinuous grayish brown (10YR 5/2) clay films on faces of peds; common fine faint grayish brown (10YR 5/2) irregular iron depletions; few prominent discontinuous black (7.5YR 2.5/1) manganese or iron-manganese stains on faces of peds; few fine irregular dark brown (7.5YR 3/2) masses of iron-manganese accumulation; common fine irregular strong brown (7.5YR 5/6) masses of iron accumulation; 5 percent subangular chert gravel; slightly acid; clear smooth boundary.

3Bt2—38 to 45 inches; brown (10YR 5/3) very gravelly clay; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots between peds; few very fine vesicular pores; common distinct discontinuous clay films on faces of peds; common fine faint grayish brown (10YR 5/2) irregular iron depletions between peds; very few distinct discontinuous dark brown (7.5YR 3/2) manganese or iron-manganese stains on faces of peds; many fine irregular yellowish red (5YR 5/6) masses of iron accumulation; 30 percent subangular chert gravel and 10 percent subrounded chert cobbles; neutral; clear smooth boundary.

3Bt3—45 to 61 inches; strong brown (7.5YR 5/6) clay; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots between peds; few very fine vesicular pores; many prominent continuous yellowish brown (10YR 5/4) clay films on faces of peds; very few prominent discontinuous black (7.5YR 2.5/1) manganese or iron-manganese stains on faces of peds; 5 percent subangular chert gravel; neutral; clear smooth boundary.

4Bt4—61 to 64 inches; light yellowish brown (10YR 6/4) silty clay loam; weak fine subangular blocky structure; firm; common very fine vesicular pores; common fine distinct light brownish gray (10YR 6/2) irregular iron depletions; common fine irregular yellowish brown (10YR 5/8) masses of iron accumulation; 5 percent subangular chert gravel; slightly alkaline; abrupt smooth boundary.

4R—64 inches; dolostone.

Range in Characteristics

Ap horizon:
Value—3 to 5
Chroma—2 or 3

Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3, 4, or 6
Texture—silty clay loam or silty clay

2Btx horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 , 3, 4, or 6
Texture—loam, silt loam, or silty clay loam

3Bt and 4Bt horizons:
Hue—2.5YR , 5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—2, 3, 4, 6, or 8
Texture—clay, silty clay, silty clay loam, or the gravelly, very gravelly, or extremely gravelly analogs of these textures

Hacreek Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landform: Stream terrace
Parent material: Fine-silty alluvium
Slope range: 0 to 2 percent

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

Typical Pedon

Hacreek silt loam, 0 to 2 percent slopes, rarely flooded; UTM—Zone 15, Easting 582900, Northing 4232900.

Ap—0 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; slightly acid; clear smooth boundary.

Btg1—13 to 21 inches; dark grayish brown (10YR 4/2) silt loam; weak fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots; few distinct discontinuous clay films; few fine rounded dark brown (7.5YR 3/2) soft iron-manganese concretions; common fine irregular dark yellowish brown (10YR 3/4) masses of iron accumulation; slightly acid; clear smooth boundary.

Btg2—21 to 28 inches; dark grayish brown (10YR 4/2) silt loam; weak fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots; common distinct discontinuous clay films; few fine rounded dark brown (7.5YR 3/2) soft iron-manganese concretions; common fine irregular dark yellowish brown (10YR 3/6) masses of iron accumulation; slightly acid; clear smooth boundary.

Btg3—28 to 41 inches; grayish brown (10YR 5/2) silt loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; common distinct discontinuous clay films; common fine rounded dark brown (7.5YR 3/2) soft iron-manganese concretions; common fine irregular brown (7.5YR 4/4) masses of iron accumulation; neutral; clear smooth boundary.

Btg4—41 to 56 inches; grayish brown (10YR 5/2) loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; common distinct discontinuous clay films; few fine rounded dark brown (7.5YR 3/2) soft iron-manganese concretions; many fine irregular dark brown (7.5YR 3/4) masses of iron accumulation; neutral; clear smooth boundary.

2C—56 to 80 inches; dark grayish brown (10YR 4/2) loam; massive; friable; many fine and medium irregular brown (10YR 4/3) masses of iron accumulation; neutral.

Range in Characteristics

Ap horizon:
Chroma—1, 2, or 3

Btg horizon:
Value—4 or 5
Texture—silt loam or silty clay loam; silt loam, silty clay loam, or loam in the lower part

2C horizon:
Value—4 or 5
Texture—loam or silt loam

Hartville Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landform: Footslope
Parent material: Clayey colluvium
Slope range: 1 to 8 percent

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

Typical Pedon

Hartville silt loam, 1 to 3 percent slopes; UTM—Zone 15, Easting 582980, Northing 4213560.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many very fine and fine roots; common very fine and fine vesicular pores with low vertical continuity; moderately acid; clear smooth boundary.

Bt—8 to 12 inches; brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; firm; common very fine and fine roots; common

very fine and fine vesicular pores with low vertical continuity; few faint discontinuous clay films on faces of peds; few fine irregular strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; clear smooth boundary.

Btg1—12 to 17 inches; dark grayish brown (10YR 4/2) silty clay; moderate fine subangular blocky structure; firm; common very fine and fine roots; few very fine and fine vesicular pores with low vertical continuity; many distinct discontinuous clay films on faces of peds; common fine irregular strong brown (7.5YR 4/6) masses of iron accumulation; strongly acid; clear smooth boundary.

Btg2—17 to 22 inches; dark grayish brown (10YR 4/2) silty clay; weak fine subangular blocky structure; firm; common very fine and fine roots; few very fine and fine vesicular pores with low vertical continuity; many distinct discontinuous clay films on faces of peds; common fine irregular strong brown (7.5YR 4/6) masses of iron accumulation; moderately acid; clear smooth boundary.

Btg3—22 to 32 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common prominent discontinuous clay films on faces of peds; many fine and medium irregular strong brown (7.5YR 4/6) masses of iron accumulation; slightly alkaline; gradual smooth boundary.

2Bt1—32 to 42 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; 25 percent brittleness; few faint discontinuous grayish brown (10YR 5/2) clay films on faces of peds; common fine distinct light brownish gray (10YR 6/2) irregular iron depletions; very few prominent discontinuous dark brown (7.5YR 3/2) manganese or iron-manganese stains on faces of peds; common fine irregular dark brown (7.5YR 3/2) masses of iron-manganese accumulation; common fine irregular strong brown (7.5YR 4/6) masses of iron accumulation; 3 percent subangular chert gravel; neutral; clear smooth boundary.

2Bt2—42 to 52 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate thin platy structure parting to moderate fine subangular blocky; very firm; 25 percent brittleness; few faint discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine distinct grayish brown (10YR 5/2) irregular iron depletions; very few prominent discontinuous dark brown (7.5YR 3/2) manganese or iron-manganese stains on faces of peds; common fine irregular dark brown (7.5YR 3/2) masses of iron-manganese accumulation; common fine irregular strong brown (7.5YR 4/6) masses of iron accumulation; 3 percent subangular chert gravel; neutral; gradual smooth boundary.

3Bt—52 to 80 inches; 50 percent grayish brown (10YR 5/2) and 50 percent brown (7.5YR 4/4) silty clay loam; weak medium subangular blocky structure; firm; few distinct discontinuous clay films on faces of peds; 3 percent subangular chert gravel; neutral.

Range in Characteristics

Ap horizon:
Value—3 to 5

BE horizon (where present):
Value—4 or 5

Bt horizon:
Value—4 or 5
Texture—silty clay or silty clay loam

Btg horizon:
Value—4 or 5
Texture—silty clay or silty clay loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—2, 3, 4, or 6
Texture—silt loam or silty clay loam

3Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2, 3, 4, or 6
Texture—silt loam or silty clay loam

Jamesfin Series

Depth class: Very deep
Drainage class: Well drained
Landform: Flood plain and stream terrace
Parent material: Fine-silty alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Fine-silty, mixed, superactive, mesic Dystric Fluventic Eutrudepts

Typical Pedon

Jamesfin silt loam, 0 to 3 percent slopes, frequently flooded; UTM—Zone 15, Easting 589410, Northing 4232150.

Ap—0 to 15 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable;

many very fine and fine roots; neutral; clear smooth boundary.
Bw1—15 to 29 inches; brown (10YR 4/3) silt loam; weak fine prismatic structure parting to weak very fine subangular blocky; friable; common very fine roots; common very fine and fine vesicular pores; common distinct discontinuous dark brown (10YR 3/3) organic coats on faces of peds; neutral; gradual smooth boundary.
Bw2—29 to 43 inches; brown (10YR 4/3) silt loam; moderate fine prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; common very fine and fine vesicular pores; common distinct discontinuous dark brown (10YR 3/3) organic coats on faces of peds; neutral; gradual smooth boundary.
Bw3—43 to 57 inches; brown (10YR 4/3) silt loam; moderate fine prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; common very fine and fine vesicular pores; common distinct discontinuous dark brown (10YR 3/3) organic coats on vertical and horizontal faces of peds; slightly acid; gradual smooth boundary.
Bw4—57 to 70 inches; brown (10YR 4/3) silt loam; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; common very fine and fine vesicular pores; common distinct discontinuous dark brown (10YR 3/3) organic coats on faces of peds; slightly acid; gradual smooth boundary.
Bw5—70 to 80 inches; brown (10YR 4/3) silt loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common very fine and fine vesicular pores; few distinct discontinuous dark brown (10YR 3/3) organic coats on faces of peds; common fine irregular brown (10YR 5/3) masses of iron accumulation between peds; slightly acid.

Range in Characteristics

Ap horizon:
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

Bw horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—3 or 4
Texture—silt loam or silty clay loam

Jemerson Series

Depth class: Very deep
Drainage class: Well drained
Landform: Stream terrace
Parent material: Fine-silty alluvium
Slope range: 0 to 2 percent

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

Typical Pedon

Jemerson silt loam, 0 to 2 percent slopes, rarely flooded; UTM—Zone 15, Easting 590270, Northing 4229880.

Ap—0 to 14 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many very fine and fine roots; common very fine and fine vesicular pores; moderately acid; abrupt smooth boundary.
Bt1—14 to 27 inches; brown (10YR 4/3) silt loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; common very fine and fine vesicular pores; many distinct discontinuous clay films on faces of peds; moderately acid; gradual smooth boundary.
Bt2—27 to 35 inches; brown (10YR 4/3) silt loam; moderate fine prismatic structure parting to moderate fine subangular blocky; friable; common very fine roots; common very fine and fine vesicular pores; many distinct discontinuous clay films on faces of peds; few prominent continuous dark brown (10YR 3/3) organic coats; moderately acid; gradual smooth boundary.
Bt3—35 to 46 inches; brown (10YR 4/3) silt loam; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots; common very fine and fine vesicular pores; common distinct discontinuous clay films on faces of peds; common prominent continuous dark brown (10YR 3/3) organic coats; common fine irregular brown (10YR 5/3) masses of iron accumulation between peds; slightly acid; gradual smooth boundary.
Bt4—46 to 56 inches; brown (10YR 4/3) silt loam; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; common very fine and fine vesicular pores; many distinct continuous clay films on faces of peds; many distinct continuous dark brown (10YR 3/3) organic coats; common fine irregular brown (10YR 5/3) masses of iron accumulation between peds; slightly acid; gradual smooth boundary.

Bt5—56 to 70 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; common very fine and fine vesicular pores; many distinct continuous clay films on faces of peds; many distinct continuous dark brown (10YR 3/3) organic coats; common fine distinct grayish brown (10YR 5/2) irregular iron depletions between peds; common fine irregular yellowish brown (10YR 5/6) masses of iron accumulation between peds; slightly acid; clear smooth boundary.

2Bt6—70 to 80 inches; dark brown (10YR 3/3) very gravelly loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; common distinct discontinuous clay films on faces of peds; 50 percent subrounded chert gravel; neutral.

Range in Characteristics

Ap horizon:
Value—3 or 4
Chroma—2 or 3

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR
Value—3 or 4
Texture—loam, gravelly loam, or very gravelly loam

Kaintuck Series

Depth class: Very deep
Drainage class: Well drained
Landform: Flood plain
Parent material: Coarse-loamy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy, siliceous, superactive, nonacid, mesic Typic Udifluvents

Typical Pedon

Kaintuck fine sandy loam, 0 to 3 percent slopes, frequently flooded; UTM—Zone 15, Easting 601320, Northing 4231400.

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many very fine, fine, and medium roots; neutral; clear smooth boundary.

C1—8 to 18 inches; brown (10YR 4/3) fine sandy loam; massive; very friable; common very fine, fine, and medium roots; common very fine and fine vesicular pores with low vertical continuity; neutral; clear smooth boundary.

C2—18 to 28 inches; brown (10YR 5/3) fine sandy loam; massive; very friable; common very fine, fine, and medium roots; common very fine and fine vesicular pores with low vertical continuity; neutral; gradual smooth boundary.

C3—28 to 38 inches; brown (10YR 4/3) fine sandy loam; massive; very friable; common very fine and fine roots; common very fine and fine vesicular pores with low vertical continuity; neutral; gradual smooth boundary.

C4—38 to 48 inches; brown (10YR 5/3) loamy sand; single grained; loose; moderately acid; gradual smooth boundary.

C5—48 to 58 inches; brown (10YR 4/3) fine sandy loam; massive; very friable; slightly alkaline; gradual smooth boundary.

C6—58 to 80 inches; brown (10YR 5/3) sand; single grained; loose; neutral.

Range in Characteristics

Ap or A horizon:
Value—3 or 4
Chroma—3 or 4

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3, 4, or 6
Texture—stratified silt loam to sand

Knobby Series

Depth class: Very shallow and shallow
Drainage class: Somewhat excessively drained
Landform: Upland
Parent material: Loamy residuum derived from dolostone
Slope range: 35 to 75 percent

Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Lithic Hapludolls

Typical Pedon

Knobby very cobbly sandy loam, in an area of Knobby-Rock outcrop-Bardley complex, 35 to 75 percent slopes, extremely stony; UTM—Zone 15, Easting 596500, Northing 4230420.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) very cobbly sandy loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable;

many very fine and fine roots; 25 percent subrounded dolostone cobbles, 10 percent angular chert gravel, and 5 percent subrounded dolostone flagstones; slightly alkaline; clear smooth boundary.
A2—3 to 9 inches; very dark grayish brown (10YR 3/2) very flaggy loamy sand, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; common very fine and fine roots; 5 percent angular chert gravel, 20 percent subrounded dolostone gravel, and 20 percent subrounded dolostone flagstones; moderately alkaline; clear irregular boundary.
R—9 inches; dolostone.

Range in Characteristics

A horizon:
Chroma—2 or 3
Texture—very cobbly, very gravelly, or very flaggy fine sandy loam, sandy loam, or loamy sand

Mariosa Series

Depth class: Very deep
Drainage class: Poorly drained
Landform: Upland
Parent material: Clayey loess over fine-silty colluvium
Slope range: 0 to 3 percent

Taxonomic classification: Fine, smectitic, mesic Chromic Vertic Albaqualfs

Typical Pedon

Mariosa silt loam, 0 to 2 percent slopes; UTM—Zone 15, Easting 614300, Northing 4226060.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many very fine and fine and few medium roots; common very fine and fine vesicular pores with moderate vertical continuity; slightly acid; abrupt smooth boundary.
E—7 to 11 inches; grayish brown (10YR 5/2) silt loam; weak very fine subangular blocky structure; friable; common fine and many very fine roots; common very fine and fine vesicular pores with moderate vertical continuity; common fine prominent yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) irregular masses of iron accumulation; strongly acid; abrupt wavy boundary.
Btg1—11 to 20 inches; grayish brown (10YR 5/2) silty clay; moderate fine subangular blocky structure; very firm; common very fine and fine roots; few very fine vesicular pores with low vertical continuity; common distinct continuous clay films on faces of peds; common medium prominent reddish brown (2.5YR 4/4) irregular masses of iron accumulation; very strongly acid; clear wavy boundary.
Btg2—20 to 28 inches; grayish brown (10YR 5/2) silty clay; moderate fine subangular blocky structure; very firm; common very fine and few fine roots; few very fine vesicular pores with low vertical continuity; common distinct continuous clay films on faces of peds; many medium prominent strong brown (7.5YR 4/6) irregular masses of iron accumulation; very strongly acid; clear smooth boundary.
Btg3—28 to 38 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium angular blocky structure; firm; common very fine roots; few very fine vesicular pores with low vertical continuity; few distinct discontinuous clay films on faces of peds; common medium prominent strong brown (7.5YR 4/6) irregular masses of iron accumulation; very strongly acid; clear smooth boundary.
2Btgx1—38 to 50 inches; light brownish gray (10YR 6/2) silt loam; moderate medium prismatic structure parting to moderate fine subangular blocky; very firm; 50 percent brittleness; common very fine roots in cracks; many very fine vesicular pores with low vertical continuity; few faint discontinuous clay films on faces of peds; common medium prominent yellowish brown (10YR 5/6) irregular masses of iron accumulation; strongly acid; gradual smooth boundary.
2Btgx2—50 to 63 inches; light brownish gray (10YR 6/2) silty clay loam; weak medium prismatic structure parting to weak fine subangular blocky; very firm; 50 percent brittleness; few very fine roots in cracks; many very fine vesicular pores with moderate vertical continuity; few faint discontinuous clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) irregular masses of iron accumulation; 5 percent subrounded chert gravel; moderately acid; gradual smooth boundary.
2Btgx3—63 to 80 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure; very firm; 50 percent brittleness; few very fine roots in cracks; many very fine vesicular pores with low vertical continuity; few faint discontinuous clay films on faces of peds; common medium prominent yellowish brown (10YR 5/6) irregular masses of iron accumulation; 5 percent subrounded chert gravel; moderately acid.

Range in Characteristics

Ap horizon:
Value—4 or 5

E horizon:
Value—5 or 6

Btg horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam or silty clay

2Btgx horizon:
Value—5 or 6
Texture—silt loam or silty clay loam

Moko Series

Depth class: Very shallow and shallow
Drainage class: Well drained
Landform: Upland
Parent material: Gravelly residuum derived from dolostone
Slope range: 3 to 50 percent

Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Lithic Hapludolls

Typical Pedon

Moko gravelly clay loam, in an area of Moko-Rock outcrop complex, 15 to 50 percent slopes, very stony; UTM—Zone 15, Easting 590680, Northing 4230210.

A1—0 to 3 inches; black (10YR 2/1) gravelly clay loam, dark gray (10YR 4/1) dry; strong fine granular structure; friable; many fine and medium roots; 25 percent subangular dolostone gravel and 8 percent subangular dolostone channers; slightly alkaline; clear smooth boundary.
A2—3 to 9 inches; very dark gray (10YR 3/1) very gravelly loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; many very fine and fine and common medium and coarse roots; 40 percent subangular dolostone gravel and 10 percent subangular dolostone channers; moderately alkaline; abrupt irregular boundary.
R—9 inches; dolostone.

Range in Characteristics

A horizon:
Value—2 or 3
Chroma—1, 2, or 3
Texture—gravelly, very gravelly, or very channery loam, silt loam, clay loam, or silty clay loam

Plato Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landform: Upland
Parent material: Clayey loess over gravelly residuum derived from dolostone
Slope range: 1 to 3 percent

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

Typical Pedon

Plato silt loam, 1 to 3 percent slopes; UTM—Zone 15, Easting 572880, Northing 4210500.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many very fine and fine and common medium roots; few very fine vesicular pores; very strongly acid; clear smooth boundary.
Bt1—6 to 14 inches; 60 percent yellowish brown (10YR 5/4) and 40 percent yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; common fine and medium roots; few very fine vesicular pores; common distinct discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.
Bt2—14 to 24 inches; 60 percent grayish brown (10YR 5/2) and 40 percent yellowish brown (10YR 5/4) silty clay; weak fine prismatic structure parting to moderate fine subangular blocky; firm; common fine, medium, and coarse roots; few very fine vesicular pores; many prominent continuous clay films on faces of peds; common fine irregular dark yellowish brown (10YR 4/6) masses of iron accumulation; very strongly acid; clear smooth boundary.
Bt3—24 to 29 inches; grayish brown (10YR 5/2) silty clay loam; moderate thin platy structure parting to moderate fine subangular blocky; firm; 15 percent brittleness; common very fine, fine, and medium roots between peds; few very fine vesicular pores; common fine dark yellowish brown (10YR 4/6) masses of iron accumulation; 5 percent subangular chert gravel; very strongly acid; clear smooth boundary.
2Btx1—29 to 37 inches; light brownish gray (10YR 6/2) extremely gravelly silt loam; weak very coarse prismatic structure; extremely firm; 85 percent brittleness; few very fine roots in cracks; common very fine and fine vesicular pores; few distinct discontinuous clay films on faces of peds; common fine irregular brown (10YR 5/3) masses of iron accumulation; 70 percent angular chert gravel; very strongly acid; gradual smooth boundary.
2Btx2—37 to 50 inches; light yellowish brown (10YR 6/4) extremely gravelly silt loam; weak very coarse

prismatic structure; extremely firm; 85 percent brittleness; common very fine and fine vesicular pores; few distinct discontinuous clay films on faces of peds; common fine distinct light brownish gray (10YR 6/2) irregular iron depletions; 65 percent angular chert gravel and 5 percent subangular chert cobbles; strongly acid; clear wavy boundary.

3Bt1—50 to 61 inches; 60 percent strong brown (7.5YR 4/6) and 40 percent yellowish brown (10YR 5/4) very cobbly clay loam; weak fine angular blocky structure; very firm; few very fine vesicular pores; common distinct discontinuous clay films on faces of peds; 30 percent subangular chert gravel and 20 percent subangular chert cobbles; strongly acid; clear wavy boundary.

3Bt2—61 to 80 inches; 50 percent red (2.5YR 4/6) and 50 percent yellowish brown (10YR 5/6) very gravelly clay; moderate fine angular blocky structure; firm; few very fine vesicular pores; common distinct discontinuous clay films on faces of peds; 40 percent subangular chert gravel and 10 percent subangular chert cobbles; strongly acid.

Range in Characteristics

Ap horizon:

Value—4 or 5
Chroma—2, 3, or 4

Bt horizon:

Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2, 3, 4, or 6
Texture—clay, silty clay, or silty clay loam

2Btx horizon:

Hue—7.5YR or 10YR
Value—4 to 6
Chroma—1, 2, 3, 4, 6, or 8
Texture—silt loam, silty clay loam, or the gravelly, very gravelly, or extremely gravelly analogs of these textures

3Bt horizon:

Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—4, 6, or 8
Texture—clay loam, silty clay loam, silty clay, clay, or the gravelly, very gravelly, or very cobbly analogs of these textures

Racoon Series

Depth class: Very deep
Drainage class: Poorly drained
Landform: Stream terrace
Parent material: Fine-silty alluvium
Slope range: 0 to 3 percent

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

Typical Pedon

Racoon silt loam, 0 to 3 percent slopes, rarely flooded; UTM—Zone 15, Easting 618745, Northing 4215850.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; common very fine and fine roots; few fine and medium vesicular pores with moderate vertical continuity; few fine rounded dark reddish brown (5YR 2.5/2) iron-manganese concretions; common fine distinct dark yellowish brown (10YR 4/4) irregular masses of iron accumulation; neutral; clear smooth boundary.

Eg1—9 to 17 inches; grayish brown (10YR 5/2) silt loam; weak very fine subangular blocky structure; friable; common very fine and fine roots; few very fine and fine vesicular pores with moderate vertical continuity; few fine rounded dark reddish brown (5YR 2.5/2) iron-manganese concretions; common fine prominent strong brown (7.5YR 4/6) irregular masses of iron accumulation between peds; strongly acid; clear smooth boundary.

Eg2—17 to 27 inches; 55 percent gray (10YR 5/1) and 45 percent grayish brown (10YR 5/2) silt loam; moderate very fine subangular blocky structure; friable; few very fine and fine roots; many very fine and fine vesicular pores with moderate vertical continuity; few fine rounded dark reddish brown (5YR 2.5/2) iron-manganese concretions; common fine prominent strong brown (7.5YR 4/6) irregular masses of iron accumulation; very strongly acid; clear smooth boundary.

Btg1—27 to 40 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; few very fine and fine vesicular pores with moderate vertical continuity; common distinct continuous clay films on faces of peds; many medium faint dark gray (10YR 4/1) irregular iron depletions; few fine rounded dark reddish brown (5YR 2.5/2) soft iron-manganese concretions; common fine prominent strong brown (7.5YR 4/6) irregular masses of iron accumulation; strongly acid; gradual smooth boundary.

Btg2—40 to 56 inches; grayish brown (10YR 5/2) silt loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many very fine and fine vesicular pores with moderate vertical continuity; common

prominent continuous dark gray (10YR 4/1) clay films on faces of peds and in pores; common fine rounded dark reddish brown (5YR 2.5/2) iron-manganese concretions; common fine prominent strong brown (7.5YR 4/6) irregular masses of iron accumulation; slightly acid; gradual smooth boundary.

Btg3—56 to 80 inches; gray (10YR 5/1) silty clay; moderate coarse prismatic structure; firm; few roots; few very fine and fine vesicular pores with moderate vertical continuity; common prominent continuous dark gray (10YR 4/1) clay films on faces of peds; few fine rounded dark reddish brown (5YR 2.5/2) iron-manganese concretions; many medium prominent strong brown (7.5YR 4/6) irregular masses of iron accumulation; neutral.

Range in Characteristics

Ap horizon:
Value—4 or 5
Chroma—2 or 3

Eg horizon:
Value—4 or 5
Chroma—1 or 2

Btg horizon:
Value—4 to 6
Chroma—1 or 2
Texture—silt loam, silty clay loam, or silty clay

Rueter Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Landform: Upland
Parent material: Gravelly colluvium over gravelly residuum derived from dolostone
Slope range: 8 to 35 percent

Taxonomic classification: Loamy-skeletal, siliceous, active, mesic Typic Paleudalfs

Typical Pedon

Rueter very gravelly silt loam, 15 to 35 percent slopes, very stony; UTM—Zone 15, Easting 605837, Northing 4214999.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; many very fine and fine and common medium and coarse roots; common very fine and fine vesicular pores; 35 percent subangular chert gravel; strongly acid; clear smooth boundary.

E—4 to 10 inches; brown (10YR 5/3) gravelly silt loam; weak very fine subangular blocky structure; friable; many very fine and fine and common medium and coarse roots; many very fine and fine vesicular pores; many medium irregular yellowish brown (10YR 5/4) masses of iron accumulation between peds; 25 percent subangular chert gravel; strongly acid; clear smooth boundary.

Bt1—10 to 20 inches; yellowish brown (10YR 5/4) very gravelly loam; moderate fine subangular blocky structure; friable; common very fine and fine and few medium and coarse roots between peds; common very fine vesicular pores; common faint discontinuous clay films on faces of peds; common medium irregular yellowish brown (10YR 5/6) masses of iron accumulation between peds; 35 percent subangular chert gravel; strongly acid; clear smooth boundary.

Bt2—20 to 31 inches; dark yellowish brown (10YR 4/4) very gravelly loam; weak fine subangular blocky structure; friable; common very fine and fine roots between peds; few very fine vesicular pores; few distinct discontinuous red (2.5YR 4/6) clay films on rock fragments; 40 percent subangular chert gravel and 10 percent subangular sandstone cobbles; strongly acid; clear smooth boundary.

Bt3—31 to 40 inches; brown (7.5YR 4/4) extremely gravelly sandy loam; weak very fine subangular blocky structure; friable; common fine and medium roots between peds; few very fine vesicular pores; common distinct discontinuous red (2.5YR 4/6) clay films on rock fragments; common fine irregular brown (10YR 5/3) soft masses of iron accumulation between peds; 60 percent subangular chert gravel; strongly acid; abrupt wavy boundary.

Bt4—40 to 51 inches; red (2.5YR 4/6) extremely stony sandy loam; weak fine subangular blocky structure; firm; common fine and medium roots between peds; few very fine vesicular pores; few distinct discontinuous red (2.5YR 4/6) clay films on faces of peds; 50 percent subangular sandstone stones and 30 percent subangular sandstone cobbles; strongly acid; abrupt wavy boundary.

Bt5—51 to 60 inches; strong brown (7.5YR 5/6) extremely cobbly sandy clay loam; weak fine subangular blocky structure; firm; common fine and few medium roots between peds; few fine vesicular pores; common distinct discontinuous yellowish red (5YR 5/6) clay films on faces of peds; 40 percent subangular chert gravel and 40 percent subangular sandstone cobbles; strongly acid; clear wavy boundary.

2Bt6—60 to 66 inches; strong brown (7.5YR 5/6) extremely gravelly clay; moderate fine subangular

blocky structure; firm; common fine and medium roots between peds; common fine vesicular pores; many distinct discontinuous yellowish red (5YR 5/6) clay films on faces of peds; 50 percent subangular chert gravel and 20 percent subangular sandstone cobbles; very strongly acid; abrupt wavy boundary.
2R—66 inches; bedrock.

Range in Characteristics

A horizon:
Value—3 to 5
Chroma—2 or 3

E horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 or 4
Texture—gravelly, very gravelly, or extremely gravelly loam or silt loam or very cobbly loam or silt loam

BE horizon (where present):
Hue—10YR
Value—5
Chroma—4
Texture—very gravelly silt loam or extremely gravelly silt loam

Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3, 4, or 6
Texture—clay loam, sandy loam, fine sandy loam, loam, silt loam, silty clay loam, sandy clay loam, or the very gravelly, extremely gravelly, very cobbly, extremely cobbly, very stony, or extremely stony analogs of these textures

2Bt horizon:
Hue—2.5YR to 10YR
Value—3 to 6
Chroma—2, 3, 4, 6, or 8
Texture—clay or the very gravelly, extremely gravelly, very cobbly, or extremely cobbly analogs of this texture

Secesh Series

Depth class: Very deep
Drainage class: Well drained
Landform: Stream terrace
Parent material: Loamy alluvium over gravelly alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Fine-loamy, siliceous, active, mesic Ultic Hapludalfs

Typical Pedon

Secesh silt loam, 0 to 3 percent slopes, rarely flooded; UTM—Zone 15, Easting 579720, Northing 4228700.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; moderate fine granular structure; friable; many very fine and fine roots; many very fine and fine vesicular pores; 3 percent subrounded chert gravel; slightly acid; clear smooth boundary.
Bt1—6 to 16 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate fine subangular blocky structure; firm; many very fine and fine roots; common very fine and fine vesicular pores; common distinct discontinuous clay films on faces of peds; 5 percent subrounded chert gravel; slightly acid; clear smooth boundary.
2Bt2—16 to 22 inches; brown (7.5YR 4/4) gravelly loam; moderate fine subangular blocky structure; firm; many very fine and fine roots; common very fine and fine vesicular pores; common distinct discontinuous clay films on faces of peds; very few prominent discontinuous very dark brown (7.5YR 2.5/2) manganese or iron-manganese stains; 30 percent subrounded chert gravel; slightly acid; clear smooth boundary.
2Bt3—22 to 36 inches; strong brown (7.5YR 4/6) loam; moderate medium prismatic structure parting to weak fine subangular blocky; firm; common very fine and fine roots; common medium vesicular pores; many distinct continuous brown (7.5YR 4/4) clay films on vertical faces of peds; very few prominent discontinuous very dark brown (7.5YR 2.5/2) manganese or iron-manganese stains; 2 percent subrounded chert gravel; strongly acid; clear wavy boundary.
2Bt4—36 to 42 inches; dark yellowish brown (10YR 4/6) loam; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common very fine and fine roots; common medium vesicular pores; many distinct continuous clay films on vertical faces of peds; very few prominent discontinuous very dark brown (7.5YR 2.5/2) manganese or iron-manganese stains; few fine irregular very dark brown (7.5YR 2.5/2) masses of iron-manganese accumulation; 10 percent subrounded chert gravel; strongly acid; clear wavy boundary.
2Bt5—42 to 58 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam; moderate fine subangular blocky structure; firm; common very fine roots between peds; common distinct discontinuous clay films on faces of peds; few fine rounded dark reddish brown (5YR 2.5/2) soft iron-manganese concretions; common fine irregular yellowish red

(5YR 4/6) masses of iron accumulation; 35 percent subrounded chert gravel and 5 percent subrounded chert cobbles; slightly acid; clear wavy boundary.

2Bt6—58 to 80 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure; firm; common distinct discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular dark brown (7.5YR 3/2) masses of iron-manganese accumulation; few fine irregular reddish brown (5YR 4/4) and common fine irregular dark yellowish brown (10YR 3/4) masses of iron accumulation; 1 percent subangular chert gravel; slightly acid.

Range in Characteristics

Ap horizon:
Value—3 or 4
Chroma—3 or 4

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 or 6

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 or 6
Texture—loam, clay loam, sandy clay loam, silty clay loam, or the gravelly or very gravelly analogs of these textures

Swiss Series

Depth class: Very deep
Drainage class: Moderately well drained
Landform: Upland
Parent material: Clayey residuum
Slope range: 3 to 35 percent

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

Typical Pedon

Swiss gravelly silt loam, 3 to 15 percent slopes, stony; UTM—Zone 15, Easting 610280, Northing 4268330.

A—0 to 3 inches; dark brown (10YR 3/3) gravelly silt loam, pale brown (10YR 6/3) dry; weak very fine granular structure; very friable; common very fine, fine, and medium roots; common very fine and fine vesicular pores; 25 percent subrounded chert gravel and 5 percent subrounded sandstone cobbles; strongly acid; clear smooth boundary.

E—3 to 9 inches; light yellowish brown (10YR 6/4) gravelly silt loam; weak fine granular structure; friable; common very fine, fine, and medium roots; common very fine and fine vesicular pores; 25 percent subrounded chert gravel and 5 percent subrounded sandstone cobbles; very strongly acid; clear smooth boundary.

2Bt1—9 to 16 inches; yellowish red (5YR 5/6) clay; weak very fine subangular blocky structure; firm; common very fine, fine, and medium roots between peds; few very fine vesicular pores; few distinct discontinuous clay films on faces of peds; common fine irregular reddish brown (2.5YR 4/4) masses of iron accumulation between peds; 5 percent subrounded sandstone cobbles; very strongly acid; clear smooth boundary.

2Bt2—16 to 20 inches; 60 percent yellowish red (5YR 5/6) and 40 percent reddish brown (2.5YR 4/4) clay; weak very fine subangular blocky structure; firm; common fine and medium roots between peds; few distinct discontinuous clay films on faces of peds; 5 percent subrounded sandstone cobbles; very strongly acid; clear smooth boundary.

2Bt3—20 to 26 inches; red (2.5YR 4/6) clay; moderate medium angular blocky structure; firm; few very fine and fine roots between peds; common distinct discontinuous clay films on faces of peds; common fine prominent very pale brown (10YR 8/2) and grayish brown (10YR 5/2) irregular iron depletions between peds; common fine irregular yellowish red (5YR 5/6) masses of iron accumulation between peds; 5 percent subrounded sandstone cobbles; very strongly acid; gradual smooth boundary.

2Bt4—26 to 32 inches; 80 percent weak red (10R 5/2) and 20 percent very pale brown (10YR 8/2) clay; weak fine prismatic structure parting to strong fine subangular blocky; very firm; few very fine and fine roots between peds; common distinct discontinuous clay films on faces of peds; common fine irregular yellowish red (5YR 5/6) masses of iron accumulation between peds; 5 percent subrounded sandstone cobbles; very strongly acid; gradual smooth boundary.

2Bt5—32 to 40 inches; 60 percent very pale brown (10YR 8/2) and 40 percent weak red (10R 5/2) silty clay; weak fine prismatic structure parting to strong fine subangular blocky; very firm; few very fine and fine roots between peds; common distinct discontinuous clay films on faces of peds; 5 percent subrounded sandstone cobbles; very strongly acid; gradual smooth boundary.

2Cd—40 to 60 inches; 80 percent weak red (10R 5/2) and 20 percent very pale brown (10YR 8/2) clay loam (unweathered fire clay); massive; extremely

firm; few very fine and fine roots; 5 percent subrounded sandstone cobbles; strongly acid.

Range in Characteristics

A horizon:
Value—3 to 5
Chroma—2 or 3

E horizon:
Value—4 to 6
Chroma—3 or 4
Texture—gravelly silt loam or very gravelly silt loam

2Bt horizon:
Hue—10R, 2.5YR, 5YR, 7.5YR, or 10YR
Value—4 to 8
Chroma—2, 3, 4, 6, or 8
Texture—clay, silty clay, silty clay loam, clay loam, or the gravelly analogs of these textures

2Cd horizon:
Hue—10R, 2.5YR, 5YR, 7.5YR, or 10YR
Value—1 to 8
Chroma—1, 2, 3, 4, 6, or 8
Texture—silty clay loam, clay, or clay loam

Union Series

Depth class: Very deep
Drainage class: Moderately well drained
Landform: Upland
Parent material: Clayey loess over residuum derived from dolostone
Slope range: 1 to 8 percent

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

Typical Pedon

Union silt loam, 3 to 8 percent slopes; UTM—Zone 15, Easting 619015, Northing 4221390.

Ap—0 to 2 inches; brown (10YR 5/3) silt loam; moderate fine granular structure; very friable; many very fine, fine, and medium roots; common very fine and fine vesicular pores with low vertical continuity; strongly acid; clear smooth boundary.

E—2 to 9 inches; light yellowish brown (10YR 6/4) silt loam; moderate fine granular structure; friable; many very fine, fine, medium, and coarse roots; common very fine and fine vesicular pores with low vertical continuity; very strongly acid; clear smooth boundary.

Bt1—9 to 19 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; common very fine, fine, medium, and coarse roots; common very fine and fine vesicular pores with low vertical continuity; many distinct discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—19 to 27 inches; 60 percent yellowish brown (10YR 5/4) and 40 percent grayish brown (10YR 5/2) silty clay loam; moderate fine subangular blocky structure; firm; common very fine, fine, and medium roots; common very fine and fine vesicular pores with low vertical continuity; few distinct discontinuous clay films on faces of peds; common fine distinct dark yellowish brown (10YR 4/6) irregular masses of iron accumulation; 3 percent angular chert gravel; very strongly acid; abrupt wavy boundary.

2Btx1—27 to 33 inches; 50 percent yellowish brown (10YR 5/6) and 50 percent light brownish gray (10YR 6/2) extremely gravelly silt loam; weak fine angular blocky structure; very firm; 65 percent brittleness; few very fine roots in cracks; many very fine vesicular pores with moderate vertical continuity; few distinct discontinuous clay films on faces of peds; 60 percent angular chert gravel and 5 percent angular chert cobbles; very strongly acid; clear wavy boundary.

2Btx2—33 to 51 inches; 80 percent pale brown (10YR 6/3) and 20 percent yellowish brown (10YR 5/4) extremely gravelly loam; massive; extremely firm; 65 percent brittleness; many very fine vesicular pores with moderate vertical continuity; few distinct discontinuous clay films on faces of peds; 75 percent angular chert gravel and 5 percent angular chert cobbles; very strongly acid; gradual smooth boundary.

2Btx3—51 to 69 inches; light brown (7.5YR 6/4) extremely gravelly loam; massive; extremely firm; 65 percent brittleness; many very fine vesicular pores with moderate vertical continuity; few distinct discontinuous clay films on faces of peds; common fine distinct pinkish gray (7.5YR 6/2) irregular iron depletions; common fine prominent reddish yellow (7.5YR 6/8) and common fine faint brown (7.5YR 5/4) irregular masses of iron accumulation; 80 percent angular chert gravel; strongly acid; gradual smooth boundary.

3Bt—69 to 80 inches; yellowish red (5YR 5/6) clay; weak coarse prismatic structure parting to moderate fine angular blocky; firm; few very fine vesicular pores with low vertical continuity; few distinct discontinuous clay films on faces of peds; few distinct discontinuous dark reddish brown (5YR 2.5/2) manganese or iron-manganese stains; common fine distinct strong brown (7.5YR 5/8)

irregular masses of iron accumulation; 10 percent angular chert gravel; strongly acid.

Range in Characteristics

Ap horizon:
Value—3 to 5
Chroma—2 or 3

E horizon:
Value—4 to 6
Chroma—3 or 4

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 or 6 (2, 3, 4, or 6 in the lower part)
Texture—silty clay loam or silty clay

2Btx horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 , 3, 4, or 6
Texture—silt loam, loam, or the gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, or extremely cobbly analogs of these textures

3Bt horizon:
Hue—2.5YR, 5YR, or 7.5YR
Value—3 to 6
Chroma—4 or 6
Texture—clay, silty clay, silty clay loam, or the gravelly analogs of these textures

Useful Series

Depth class: Deep
Drainage class: Moderately well drained
Landform: Upland
Parent material: Loess over clayey residuum derived from dolostone
Slope range: 3 to 15 percent

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

Typical Pedon

Useful silt loam, 3 to 8 percent slopes; UTM—Zone 15, Easting 578520, Northing 4236560.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; moderate fine granular structure; friable; many very fine and fine roots; many very fine vesicular pores; slightly acid; clear smooth boundary.
BE—7 to 11 inches; brown (7.5YR 5/4) silt loam; weak thin platy structure parting to moderate fine granular; friable; many very fine and fine roots; many very fine and fine vesicular pores; strongly acid; clear smooth boundary.
Bt1—11 to 15 inches; strong brown (7.5YR 4/6) silty clay loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots between peds; common very fine vesicular pores; many distinct discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.
Bt2—15 to 23 inches; strong brown (7.5YR 4/6) silty clay loam; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; common very fine, fine, medium, and coarse roots between peds; common very fine vesicular pores; many distinct discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.
Bt3—23 to 29 inches; 60 percent dark yellowish brown (10YR 4/6) and 40 percent yellowish red (5YR 4/6) silty clay loam; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots between peds; common very fine vesicular pores; common distinct discontinuous clay films on faces of peds; few fine irregular black (7.5YR 2.5/1) soft masses of iron-manganese accumulation; strongly acid; clear smooth boundary.
2Bt4—29 to 41 inches; 50 percent yellowish red (5YR 4/6) and 50 percent yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure; firm; 25 percent brittleness; few very fine and fine roots between peds; common very fine vesicular pores; few distinct discontinuous clay films on faces of peds; common fine irregular light brownish gray (10YR 6/2) iron depletions; common fine irregular black (7.5YR 2.5/1) masses of iron-manganese accumulation; 2 percent subangular chert gravel; strongly acid; clear wavy boundary.
3Bt5—41 to 57 inches; 60 percent dark yellowish brown (10YR 4/4) and 40 percent dark red (2.5YR 3/6) very gravelly clay; moderate fine subangular blocky structure; firm; few very fine roots between peds; few very fine vesicular pores; common prominent continuous grayish brown (10YR 5/2) clay films on rock fragments and few distinct discontinuous clay films on faces of peds; common fine irregular black (7.5YR 2.5/1) masses of iron-manganese accumulation; 40 percent angular chert gravel and 10 percent angular chert cobbles; neutral; abrupt wavy boundary.
3R—57 inches; dolostone.

Range in Characteristics

Ap horizon:
Value—3 to 5
Chroma—2, 3, or 4

BE horizon:
Hue—7.5YR or 10YR
Value—5
Chroma—3 or 4

Bt horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—3, 4, or 6
Texture—silty clay, silty clay loam, or the gravelly analogs of these textures

2Bt and 3Bt horizons:
Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—2, 3, 4, or 6
Texture—clay, silty clay, silty clay loam, or the gravelly or very gravelly analogs of these textures

Table 21.--Classification of the Soils

Soil name	Family or higher taxonomic class
Alred	Loamy-skeletal over clayey, siliceous, semiactive, mesic Typic Paleudalfs
Bardley	Very fine, mixed, active, mesic Typic Hapludalfs
Beemont	Very fine, smectitic, mesic Oxyaquic Hapludalfs
Cedargap	Loamy-skeletal, mixed, superactive, mesic Cumulic Hapludolls
Cotton	Fine, smectitic, mesic Fragiaquic Hapludalfs
Deible	Fine, mixed, active, mesic Typic Albaqualfs
Freeburg	Fine-silty, mixed, superactive, mesic Aquic Hapludalfs
Gatewood	Very fine, mixed, active, mesic Oxyaquic Hapludalfs
Gladden	Coarse-loamy, siliceous, superactive, mesic Dystric Fluventic Eutrudepts
Gravois	Fine-silty, mixed, active, mesic Aquic Paleudalfs
Gunlock	Fine, mixed, active, mesic Fragic Oxyaquic Hapludalfs
Hacreek	Fine-silty, mixed, superactive, mesic Aquic Argiudolls
Hartville	Fine, mixed, active, mesic Aquic Hapludalfs
Jamesfin	Fine-silty, mixed, superactive, mesic Dystric Fluventic Eutrudepts
Jemerson	Fine-silty, mixed, superactive, mesic Typic Hapludalfs
Kaintuck	Coarse-loamy, siliceous, superactive, nonacid, mesic Typic Udifluvents
Knobby	Loamy-skeletal, mixed, superactive, mesic Lithic Hapludolls
Mariosa	Fine, smectitic, mesic Chromic Vertic Albaqualfs
Moko	Loamy-skeletal, mixed, superactive, mesic Lithic Hapludolls
Plato	Fine, mixed, active, mesic Aquic Fragiudalfs
Racoon	Fine-silty, mixed, superactive, mesic Typic Endoaqualfs
Rueter	Loamy-skeletal, siliceous, active, mesic Typic Paleudalfs
Secesh	Fine-loamy, siliceous, active, mesic Ultic Hapludalfs
Swiss	Fine, mixed, semiactive, mesic Oxyaquic Hapludalfs
Union	Fine, mixed, active, mesic Oxyaquic Fragiudalfs
Useful	Fine, mixed, active, mesic Oxyaquic Hapludalfs

Formation of the Soils

This section relates the soils in the survey area to the major factors of soil formation.

Soil is the product of soil-forming processes acting on accumulated or deposited geologic material. The characteristics of the soil are determined by the type of parent material; the plant and animal life on and in the soil; the climate under which the soil-forming factors were active; topography, or lay of the land; and the length of time these forces have been active.

The parent material affects the kind of soil profile that is formed and, in extreme cases, determines it almost entirely. Plant and animal life are the active factors of soil formation. The climate determines the amount of water available for leaching and the amount of heat for physical and chemical changes. Together, climate and plant and animal life act on the parent material and slowly change it to a natural body that has genetically related horizons. Topography often modifies these other factors. Finally, time is required for changes in the parent material to result in the formation of a soil. Generally, a long time is required for the development of distinct soil horizons.

These factors of soil formation are all so closely interrelated in their effects on the soil that few generalizations can be made about the effect of any one factor unless conditions are specified for the other four. Soil formation is complex, and many processes of soil development are still unknown.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. The accumulation or deposition of this material is the first step in the development of a soil profile. The characteristics of this material determine the chemical and mineralogical composition of the soil. The parent materials in Maries County are residuum (material weathered from bedrock), loess (silty material deposited by wind), and alluvium (material deposited by water).

Most of the residuum in Maries County is derived from clays and the associated sandstone and clastic rocks of the Pennsylvanian System and from the sandstone and dolostone formations of the Ordovician System (Howe and Koenig, 1961).

The youngest residual parent materials in the county are Pennsylvanian clays, sandstone, shale, and the associated chert of unknown origin. These materials lie unconformably on eroded surfaces of the Ordovician system, primarily that of Jefferson City dolostone. Filled sink deposits of refractory clays can occur at the contact point of these systems. Some of these "clay pits" have been mined. Sandstone rimrock commonly is associated with these filled sinks. Swiss soils formed in deposits of clay or in material weathered from these rocks and the associated chert.

Most of the exposed dolostone in Maries County is from the Jefferson City Formation. The underlying Roubidoux and Gasconade Formations contain more chert as well as interbedded sandstone and sandy dolostone than the Jefferson City Formation and are less extensive, occurring mainly along the major rivers and streams, such as the Gasconade and Maries Rivers, and Little Tavern Creek in the northwestern part of the county. Gatewood and Moko soils formed mainly in the less cherty, argillaceous residuum of the Jefferson City Formation, and Rueter soils formed in the loamy residuum from the Roubidoux Formation and thus contain higher proportions of chert. Alred soils formed in the argillaceous residuum of the Gasconade Formation. Bardley and Knobby soils also occur in some very steep areas of this formation adjacent to major streams.

Loess probably once covered all of the survey area. It was deposited during the most recent postglacial period. The sources of this material were the flood plains along the Missouri River and its tributaries. Choked with sediment deposited by glacial meltwater and nearly barren in the still frigid climate, these valleys were the focus of violent dust storms. The resulting deposits blanketed the landscape to depths that were greatest on the river hills and decreased with distance from the source. Erosion removed the loess at widely varying rates. It apparently kept pace with deposition on the steep, sun-warmed south and west exposures, where removal has been complete. North and east aspects, in contrast, remained frozen longer and retained an appreciable amount of the loess, as did ridgetops where erosion rates are minimal. On the more stable landforms, the thickness of the loess

ranges from about 20 to 40 inches. The upper part of Cotton, Gravois, Gunlock, Mariosa, Plato, Union, and Useful soils formed in loess.

The pattern of loess distribution indicates that no major alterations of landforms have occurred since the loess was deposited (Brown, 1981). Subsequent geologic erosion has had little effect on the landscape, though it has removed some surface material, mainly loess.

The soils on the flood plains in Maries County formed in alluvial deposits ranging in thickness from about 3 feet to more than 30 feet. These soils differ widely in texture and chemical composition, reflecting a diversity of origin, varying floodwater velocity, and various kinds of primary source material.

Flood plains along the Gasconade and Maries Rivers, Little Tavern Creek, and their tributaries formed mainly in silty and loamy alluvium. The basal deposits commonly are gravel, and the soil particles or coarse fragments decrease in size toward the surface. A similar gradation occurs as the distance downstream increases. The gravelly Cedargap soils are on narrow upstream flood plains, and the silty Jamesfin soils dominate the broader flood plains. Gladden soils occur intermediately between the Cedargap and Jamesfin soils and comprise a large portion of the flood plains in the county. The abundance of loess as a source material and predictable decreases in stream velocity and gradient along descending watercourses cause this gradation.

Living Organisms

The living organisms that influence soil formation include plants, burrowing animals, worms, insects, bacteria, and fungi in the soil. Among the soil properties affected are the content of organic matter and nitrogen, reaction, color, structure, and porosity.

The composition of plant communities is variable depending on the climate, depth, fertility level, available water capacity, and drainage class of the soil. Indigenous organic matter at the surface of soils that formed under forest vegetation is derived mainly from leaves, twigs, and logs, which decompose at the surface. These materials tend to be acidic. The resulting forest soils have a thin, dark surface layer and commonly have a leached subsurface layer. The Plato series is an example of soils that formed under these conditions.

In contrast, the natural organic matter at the surface of soils that formed under prairie grasses is derived mainly from the decay of grasses and annual and biennial forbs. These plants are very effective in the uptake of bases, have a greater proportion of root mass than forest vegetation, and have a comparatively short life span, resulting in a surface layer that is darker, thicker, and less acidic than that of soils that formed under forest vegetation.

The soils that formed under grasses in Maries County are not extensive. Because the rainfall was adequate for forest vegetation, prairie grasses were limited to areas that were too wet or too dry for trees. Hacreek soils on bottomland and grassy upland glades of the Knobby and Moko soils formed on such sites. Some areas have been dominated by grass vegetation periodically but not for long enough periods to leave a permanent signature, such as a dark surface layer.

Worms, insects, burrowing animals, large animals, and humans all affect and disturb the soil. Earthworms alone pass through their bodies as much as 15 tons of dry earth per acre each year (Buckman and Brady, 1972). The digestive enzymes and grinding action contribute significantly to the mixing and aeration of the soil, the breakdown of mineral and organic material, and the increased availability of plant nutrients. Other higher animals affect the soil primarily by the mechanical mixing they produce. However, actinomycetes, bacteria, and fungi contribute more to the formation of soils than do animals; under favorable conditions, these organisms may comprise as much as 2 tons of mass in the plow layer of each acre. These micro-organisms cause rotting of organic materials, improve tilth, and fix nitrogen in the soils. The population of soil organisms is directly related to the rate of decomposition of organic matter in the soil. Differences in vegetation influence the kinds and populations of organisms and their activity.

Since the time of settlement, human activities have affected soil formation. Some of these effects have been drastic. Removal of trees and intensive cultivation and overgrazing have resulted in severe erosion in many areas. All of the productive topsoil has been lost in some places. Much of the sloping cropland and some poorly managed pastures are still eroding at a rate in excess of what is considered tolerable to sustain production. Some prime farmland has been covered by urban and residential areas. In addition to displacing productive land, these urban areas increase the rate of runoff because of roofs, roads, parking lots, and other structures that prevent water infiltration. Poor siting and design of sewage systems and other waste disposal have degraded water quality in some areas. Responsible land use that respects future generations as well as the present is needed. This soil survey can help people to implement wise use of our natural resources.

Climate

Climate has been an important factor in soil formation. Geologic erosion, the kinds of plant and animal life, and the parent materials of the soils have been directly affected by the climate.

Soil formation was greatly affected by the climatic changes that produced glaciation. Thousands of years of cold temperatures alternating with moderate temperatures apparently produced the glaciers that moved into northern Missouri (Buol and others, 1980). The advent of warmer weather patterns caused the glaciers to recede. Meltwaters made the atmosphere more humid and volatile. The unprotected bedload from the glacier was blown by relentless winds generated by the climate change. The windblown material was carried to the southeast, gradually depositing the loess mantle that now covers much of the county. The climate at that time was cool and moist, and the native vegetation was woodland. A subsequent period of significantly lower rainfall caused small prairies to develop. The present climate favors encroachment of forests, but prior to settlement, wildfire played a crucial role in maintaining prairies by killing woody seedlings intruding in the grasslands and stimulating the growth of fire-tolerant warm-season grasses.

In addition to influencing native vegetation, the climate has a direct physical influence on the soil. The present subhumid midcontinental climate has distinct temperature fluctuations and predictable rainfall distribution with the seasons. Freeze-thaw cycles are very effective in promoting the gradual disintegration of exposed bedrock. Any crevice that is large enough for water to enter is subject to more fracture when the water freezes. South-facing slopes are subject to more of these cycles than corresponding north-facing slopes because sunlight warms them more during the day.

Clay-sized particles form throughout the soil through mechanical weathering and through synthesis from weathering of primary minerals. Moisture deficits in the summer contribute to cracking, which is instrumental in the development of argillic horizons in the subsoil. Rainfall percolating through the soil disperses clay-sized particles in the upper layers of the soil, which move down into the cracks along with the percolating water. As the water is absorbed into the dry soil along the cracks, the clay particles are left on the surface of the cracks and create clay films that define the aggregation of the soil and gradually increase the content of clay. Eventually much of the clay leaves the surface layer and migrates into the subsoil by this mechanism. The degree and depth of this translocation are indicators of the age of the soil. Most of the upland soils in Maries County show evidence of this clay movement.

Surplus moisture in the spring and late fall creates zones of saturation in some soils and influences the color of the subsoil. In general, gray colors are indicative of wetness because of reduction of iron in the soil. Conversely, brown or red colors are associated with oxidation in the soil and indicate free movement of water through the soil. Some soils, such as Racoon soils, have a continuous water table in the profile. Other soils, such as Plato, have noncontinuous zones of saturation that occur because of subsoil horizons that temporarily hold the water up. These zones are referred to as a perched water table. Some soils that are saturated for long periods support indicator plant species, such as smartweed, various sedges, silver maple, or cottonwood. This saturation affects suitability for some agricultural crops that are sensitive to wetness, such as alfalfa, and also the effective length of the growing season in areas where cultivation and seedbed preparation are delayed by the seasonal wetness.

The influence of the regional climate on soil formation is modified in many places by local conditions. For example, the Moko soils on south- and west-facing slopes and the Knobby soils on bluffs along the Gasconade River formed under the influence of a microclimate that is warmer and less humid than that which occurs on opposite north- and east-facing slopes.

Topography

Topography, or relief, refers to the general degree of variance in the surface of the earth, the changes in elevation, and the nature of the slopes between one elevation and another. It is an important factor in determining the pattern and distribution of soils on a landscape because of its influence on drainage, runoff, erosion, and microclimate.

Topography results from natural forces that create unevenness in the land surface. In Maries County, the streams that carry runoff from the flanks of the Ozark uplift have incised through dolostone and sandstone bedrock, creating entrenched and meandering stream valleys. Smaller streams branch toward the uplands, dissecting the side slopes that intervene between long interconnected ridgetops.

The amount of water entering and passing through the soil depends upon the steepness and shape of the slope, the permeability of the soil material, and the amount and intensity of rainfall. On steep soils, runoff is rapid and very little water passes through the soil. Consequently, distinct horizons are slow to develop. The removal of weathered products by geologic erosion may nearly equal the rate of accumulation on some sites. Knobby and Moko soils, for example, formed

under these conditions. On gently sloping or nearly level upland soils, runoff is slow and most of the water passes through the soil. As a result, these soils show maximum profile development. Mariosa soils are examples of this process. Because of runoff from adjacent hillsides, footslope areas receive an extra increment of water in addition to direct rainfall. Hartville soils are examples of soils in these positions.

Concave areas are generally wetter than other slopes because as runoff converges in these areas, the water flow is concentrated and the volume that goes over and through the soil is greater. Convex areas are drier because the divergent water flow pattern disperses the water, resulting in a smaller volume going over and through the soil.

South-facing slopes receive relatively more direct sunlight, which contributes to faster warming and drying of the soil and differences in native vegetation. This topographical position is also characterized by more freeze-thaw cycles than the corresponding north-facing slopes, which tend to stay frozen longer.

Time

The degree of profile development reflects the length of time the parent material has been in place and subjected to weathering processes. Young soils show very little profile development or horizon differentiation. Older soils show the effects of the movement of clay and leaching and have distinct horizons that are readily observable.

The youngest soils in Maries County are those that formed in alluvium. Kaintuck soils, for example, show little profile development. Alluvial material is added to the surface nearly every year. Deible, Freeburg, Hacreek, Jemerson, Racoon, and Secesh soils are the oldest alluvial soils in the county. They are on high flood plains and show moderate profile development.

The oldest soils in the survey area formed in cherty residuum on upland side slopes. Long periods of time were necessary for the bedrock matrix to weather and for the cherty residuum, in which Alred, Bardley, Gatewood, Beemont, and Rueter soils formed, to accumulate. Swiss soils are also considered old, but they formed in clayey residuum that did not weather directly from bedrock.

Many areas reflect dual chronologies. In Cotton, Gravois, Gunlock, Mariosa, Plato, and Useful soils, for example, the underlying material is older than the upper part of the profile and has strongly expressed horizons. This older material is covered by younger loess, which has in turn developed horizons of its own.

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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.

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.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Backslopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

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.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottomland. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for

reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clayey soil. Silty clay, sandy clay, or clay.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from the adjacent stands.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 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.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

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.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deep to water (in tables). Deep to permanent water during the dry season.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to bedrock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Droughty (in tables). Soil holds too little water for plants during dry periods.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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.

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.

Erodes easily (in tables). Soil is easily eroded by water.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Even aged. Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, 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 is, 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.

Flooding (in tables). Soil flooded by moving water from stream overflow or runoff.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to pack (in tables). Difficult to compact using regular earthwork construction equipment.

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.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Highly erodible (in tables). Soil has an erodibility index greater than 8 and is very susceptible to erosion by water.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An

explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

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.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

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.

Infrequent flooding (in tables). Flooding occurs at an interval that limits riparian plant species.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

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.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

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.

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.

Ksat. Saturated hydraulic conductivity. (See Permeability.)

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

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.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low adsorption (in tables). Low amounts of cations are adsorbed from wastes applied to the soil.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

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).

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

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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 downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

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.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained,

the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Sand or loamy sand.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Seasonally ponded (in tables). Standing water on soils in closed depressions that is removed only by percolation or evapotranspiration. Generally occurs during the winter and early spring.

Seasonal wetness (in tables). The soil may be wet during the period of desired use. This usually occurs during the winter and early spring.

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.

Sedimentary uplands. Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the backslope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or

management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slope/erodibility (in tables). A combination of slope and susceptibility to water erosion may be restrictive in the use of this soil.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil reaction (in tables). A measure of acidity or alkalinity of a soil, expressed in pH values, which indicates that the soil reaction is either too high or too low for the intended use.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stickiness (surface) (in tables). The soil is slippery and sticky when wet and slow to dry.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected

remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Subsurface layer. Any subsurface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

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 textural classes are *C—clay, CL—clay loam, COS—coarse sand, COSL—coarse sandy loam, FS—fine sand, FSL—fine sandy loam, L—loam, LCOS—loamy coarse sand, LFS—loamy fine sand, LS—loamy sand, LVFS—loamy very fine sand, S—sand, SC—sandy clay, SCL—sandy clay loam, SI—silt, SIC—silty clay, SICL—silty clay loam, SIL—silt loam, SL—sandy loam, VFS—very fine sand, and VFSL—very fine sandy loam.* Terms used in lieu of texture are *WB—weathered bedrock and UWB—unweathered bedrock.* The texture modifiers that may apply to textural classes are *BY—bouldery, BYV—very bouldery, BYX—extremely bouldery, CB—cobbly, CBV—very cobbly, CBX—extremely cobbly, CN—channery, CNV—very channery, CNX—extremely channery, FL—flaggy, FLV—very flaggy, FLX—extremely flaggy, GR—gravelly, GRV—very gravelly, GRX—extremely gravelly, PCN—parachannery, PCNV—very parachannery, SR—stratified, ST—stony, STV—very stony, and STX—extremely stony.*

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The outermost inclined surface at the base of a hill; part of a footslope.

Too acid (in tables). The soil is so acid that growth of plants is restricted.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Too clayey (in tables). The soil is slippery and sticky when wet and slow to dry.

Too sandy (in tables). The soil is soft and loose, droughty, and low in fertility or is too fine to use as gravel.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat surface that was cut or built by stream or wave action.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wetness (in tables). The soil is wet during the period of desired use.

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.