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Natural Resources
Conservation Service



In cooperation with
the United States
Department of Interior,
National Park Service
and Colorado State
University

Soil Survey of Rocky Mountain National Park, Colorado, Parts of Boulder, Grand, and Larimer Counties



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 1998. Soil names and descriptions were approved in 1999. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1998. This survey was made cooperatively by the Natural Resources Conservation Service; the United States Department of Interior, National Park Service; and Colorado State University. The survey is part of the technical assistance furnished to the National Park Service.

A small part of this soil survey was published in 1983 as a part of the Soil Survey of Grand County Area, Colorado. That portion in Grand County (3,240 acres) is superseded by this soil survey.

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

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Cover: A typical view of the alpine and subalpine ecosystems in the upper Hague Creek drainage. Trailridge and Mummy soils, with alpine tundra vegetation, are on the mountain summits in the right background. Rock outcrop is common on the steep slopes. Fallriver soils are on the forested glacial moraine, and Kawuneeche soils are in the meadow in the foreground.

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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. Ecologists, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum recreational use and wildlife habitat. Planners, community officials, engineers, and builders 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 user is responsible for identifying and complying with existing laws and regulations.

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

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



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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 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.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate, geology, and biological activity (USDI-USGS, 1968). 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.

This survey area was mapped at two levels of detail. At the more detailed level, map units are narrowly defined. Map unit boundaries were plotted and verified at closely spaced intervals. At the less detailed level, map units are broadly defined. Boundaries were plotted and verified at wider intervals. The detail of mapping was selected to meet the anticipated long-term

use of the survey, and the map units were designed to meet the needs for that use.

Conventional soil survey techniques were used for the more detailed level of mapping. Much of the area mapped at this level includes important wetlands and valley areas that are intensively used. These areas were accessible and could be transected efficiently on foot. Soil survey techniques used at the less detailed level were quite different, largely because of the remote and poorly accessible topography. Specially designed geostatistical methods were employed for this area (Cipra, Neve, Petersen, and Wheeler, 1999).

The geostatistical methods were based on data gathered from block transects that were delineated on aerial photographs prior to the fieldwork. These areas were carefully selected to represent significant landforms, aspects, and plant communities. An individual block had dimensions at the ground surface of 1,000 feet by 2,000 feet and was oriented lengthwise downslope. Each block contained five soil description sites and four satellite sites, each of which was randomly located. The five soil description sites comprised one complete pedon described to a depth of 60 inches, and four pedons described to a depth of 30 to 40 inches (or to a root-limiting layer if above those depths). Standard soil pedon data was collected at the five soil description sites, including texture, consistence, pH, horizons, rock fragment content, slope, aspect, parent material, surface layer organic matter content, and vegetation. At the four satellite sites, vegetation, surface layer organic matter content, slope, aspect, and parent material were described.

All soil description sites in the blocks were geographically referenced using global positioning systems and recorded in Universal Transverse Mercator units (UTMs). Data recorded in the blocks allowed soil scientists to identify the typical soils and to describe the composition of the map units. The information was given to Colorado State University and a geostatistical model was developed to analyze the data and provide maps of projected soil components on landforms. The projections were used as a tool to complete mapping in areas that could not be traversed efficiently on foot. Helicopters were used to great advantage in some areas to verify the soil map units that

had been predicted by the geostatistical model.

Species of native plants were identified by soil scientists at the sample sites within the block transects. After the vegetative data was compiled, the representative plant community of each soil was correlated to an ecological site described in the U.S. Forest

Service system "Plant Associations Of Region Two" (USDA- Forest Service, 1987). A thorough and systematic inventory of the vegetation was beyond the scope of this soil survey. Plant specialists or ecologists were not directly involved in identifying or in correlating the vegetation.

General Soil Properties

The formation of the soils of Rocky Mountain National Park has been strongly influenced by landform and climate. There is a wide range in soil properties from the warmer and drier valleys to the high elevation tundra.

Soils of the low elevation valleys are generally very deep, loamy, and, particularly on the east side of the Park, have dark-colored surface horizons. In the floodplains they are poorly or very poorly drained with stratified textures. On stream terraces they are well drained. They formed in alluvium from the nearby mountains.

Soils of the glacial moraines are very deep, well or somewhat excessively drained, and loamy or sandy with a high content of rock fragments. They formed in till derived mainly from granite, gneiss, and schist.

Soils of the subalpine mountain slopes are generally well or somewhat excessively drained, loamy with a high content of rock fragments, and have light-colored surface horizons. Depth to the underlying bedrock ranges from shallow to very deep. Typically soil reaction becomes more acid with increasing elevation, as the climate becomes cooler and more moist. These soils formed mainly in material weathered from granite, gneiss, and schist.

Soils of the alpine mountains and ridges are generally well drained, loamy with a high content of rock fragments, strongly acid, and have dark-colored surface horizons. These soils formed mainly in material weathered from granite, gneiss, and schist. Poorly drained soils are common in landscape depressions and drainageways.

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 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, Kawuneeche loam, 0 to 1 percent slope is a phase of the Kawuneeche series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

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. Fallriver-Hiamovi complex, 10 to 55 percent slopes is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Archrock-Fallriver association, 15 to 50 percent slopes is an example.

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

Tables included in this report 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.

Soil Descriptions

1—Archrock-Fallriver association, 15 to 50 percent slopes

Map Unit Setting

General location: At timberline

Native vegetation: Tundra grasses and forbs on Archrock soils; stunted fir and spruce trees on Fallriver soils

Elevation: 10,500 to 12,000 feet (3,200 to 3,658 meters)

Average annual precipitation: 30 to 40 inches (762 to 1,016 millimeters)

Average annual air temperature: 34 to 38 degrees F (1 to 4 degrees C)

Frost-free period: Archrock 10 to 30 days, Fallriver 20 to 50 days

Map Unit Composition

Archrock and similar soils — 50 percent

Fallriver and similar soils — 35 percent

Minor components — 15 percent

Component Description

Archrock Soils

Landform: Mountains

Geomorphic positions: Shoulders and backslopes

Parent material: Gravelly slope alluvium and residuum weathered from schist, granite, and gneiss

Ecological site: Alpine clover/Golden avens

Slope: 15 to 35 percent

Surface fragments: About 20 percent cobbles, about 1 percent stones, and about 45 percent gravel

Depth to restrictive feature: Bedrock (paralithic) — 20 to 40 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.2 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A—0 to 8 inches; gravelly loam

Bw—8 to 18 inches; very gravelly loam

2BC—18 to 25 inches; very gravelly coarse sandy loam

2Cr—25 to 35 inches; weathered bedrock

Fallriver Soils

Landform: Glaciated mountain slopes

Geomorphic position: Backslopes

Parent material: Colluvium and till derived from granite, gneiss, and schist

Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry

Slope: 15 to 50 percent

Surface fragments: About 1 percent stones and about 1 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 3.3 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 9 inches; gravelly sandy loam

Bs1—9 to 21 inches; very cobbly sandy loam

Bs2—21 to 35 inches; very cobbly sandy loam
 BC—35 to 63 inches; very gravelly coarse sandy loam

Minor Components

Onahu and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountains

Distinguishing characteristics: Has a seasonal high water table

Trailridge and similar soils

Composition: About 5 percent

Positions on landforms: Summits, shoulders on mountains

Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

Ypsilon and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Has significant accumulations of iron and aluminum in the subsoil

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

2—Archrock-Onahu-Rock outcrop complex, 10 to 75 percent slopes

Map Unit Setting

General location: Tundra below snowfields

Native vegetation: Mainly alpine grasses, forbs, and shrubs

Elevation: 11,000 to 12,500 feet (3,353 to 3,810 meters)

Average annual precipitation: 30 to 40 inches (762 to 1,016 millimeters)

Average annual air temperature: 34 to 38 degrees F (1 to 3 degrees C)

Frost-free period: 10 to 30 days

Map Unit Composition

Archrock and similar soils — 35 percent
 Onahu and similar soils — 25 percent
 Rock outcrop — 20 percent
 Minor components — 20 percent

Component Description

Archrock Soils

Landform: Mountains

Geomorphic positions: Shoulders and summits

Parent material: Slope alluvium over residuum weathered from schist, gneiss, and granite

Ecological site: Parry's clover/tufted hairgrass

Slope: 10 to 40 percent

Surface fragments: About 1 percent stones, about 45 percent gravel, and about 20 percent cobbles

Depth to restrictive feature: Bedrock (paralithic) — 20 to 40 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.2 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A—0 to 8 inches; gravelly loam

Bw—8 to 18 inches; very gravelly loam

2BC—18 to 25 inches; very gravelly coarse sandy loam

2Cr—25 to 35 inches; weathered bedrock

Onahu Soils

Landforms: Cirques and glaciated mountain slopes

Geomorphic positions: Footslopes, backslopes, and toeslopes

Parent material: Loamy alluvium over gravelly till derived from granite, gneiss, and schist

Ecological site: Planeleaf willow/water sedge

Slope: 10 to 25 percent

Surface fragments: About 5 percent boulders, about 10 percent cobbles, and about 7 percent stones

Depth to restrictive feature: Bedrock (paralithic) — 40 to 60 inches

Drainage class: Poorly drained

Slowest permeability class: Moderate
Available water capacity: About 3.9 inches
 (Low)
Flooding hazard: None
Ponding hazard: None
Water table: Present

Typical profile:

A1—0 to 7 inches; loam
 A2—7 to 16 inches; loam
 2Bg—16 to 24 inches; very gravelly
 sandy loam
 2Cg—24 to 45 inches; very gravelly
 sandy loam
 3Cr—45 to 55 inches; weathered
 bedrock

Rock outcrop

Description: Rock outcrop consists of
 exposed granite, gneiss, and schist.
Landform: Mountains
Geomorphic positions: Shoulders, summits
Slope: 15 to 75 percent
Slowest permeability class: Impermeable

Minor Components

Trailridge and similar soils
Composition: About 10 percent
Positions on landforms: Backslopes,
 shoulders on mountains
Distinguishing characteristics: Soft
 bedrock at depths of less than 20
 inches

Mummy and similar soils
Composition: About 5 percent
Positions on landforms: Backslopes,
 footslopes on mountains
Distinguishing characteristics: Soil
 depth is greater than 60 inches

Rubble land
Composition: About 5 percent
Position on landform: Backslopes on
 mountains
Distinguishing characteristics: Areas of
 accumulated cobbles, stones, and
 boulders (talus)

A typical soil description with range in
 characteristics is included, in alphabetical
 order in the "Classification of the Soils"
 section. See "Chemical Properties of Soils,"
 "Physical Properties of Soils," and
 "Engineering Index Properties" tables for
 component horizon data.

3—Bullwark-Catamount complex, 20 to 50 percent slopes

Map Unit Setting

General location: The eastern part of the
 survey area
Native vegetation: Mainly pine trees
Elevation: 8,000 to 9,900 feet (2,438 to
 3,018 meters)
Average annual precipitation: 18 to 24
 inches (460 to 610 millimeters)
Average annual air temperature: 37 to 42
 degrees F (3 to 5 degrees C)
Frost-free period: 50 to 70 days

Map Unit Composition

Bullwark and similar soils — 50 percent
 Catamount and similar soils — 40 percent
 Minor components — 10 percent

Component Description

Bullwark Soils

Landform: Mountain slopes
Geomorphic positions: Footslopes
 and backslopes
Parent material: Colluvium and residuum
 weathered from granite, gneiss, and
 schist
Ecological site: Lodgepole pine/elk sedge
Slope: 20 to 50 percent
Surface fragments: About 1 percent stones,
 about 2 percent cobbles, and about 10
 percent gravel
Depth to restrictive feature: Bedrock
 (paralithic) — 20 to 40 inches; bedrock
 (lithic) — 30 to 50 inches
Drainage class: Well drained
Slowest permeability class: Moderate
Available water capacity: About 1.3 inches
 (Very low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

Oi—0 to 2 inches; slightly decomposed
 plant material
 E—2 to 9 inches; very gravelly coarse
 sandy loam
 E and Bt1—9 to 15 inches; very
 gravelly sandy loam

E and Bt2—15 to 23 inches; very cobbly sandy loam
 Cr—23 to 32 inches; weathered bedrock
 R—32 to 60 inches; unweathered bedrock

Catamount Soils

Landform: Structural benches

Geomorphic positions: Backslopes, shoulders, and summits

Parent material: Gravelly slope alluvium and residuum weathered from granite, gneiss, and schist

Ecological site: Lodgepole pine/kinnikinnick
Slope: 20 to 50 percent

Surface fragments: About 1 percent stones, about 5 percent gravel, and about 1 percent cobbles

Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.7 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oi—0 to 1 inch; slightly decomposed plant material
 A—1 inch to 3 inches; gravelly coarse sandy loam
 Bw—3 to 10 inches; very gravelly coarse sandy loam
 C—10 to 14 inches; very gravelly coarse sandy loam
 Cr—14 to 24 inches; weathered bedrock

Minor Components

Granite and similar soils

Composition: About 5 percent

Positions on landforms: Footslopes, backslopes on mountain slopes

Distinguishing characteristics: Soil depth is greater than 60 inches and has a developed subsoil

Legault and similar soils

Composition: About 5 percent

Positions on landforms: Summits, backslopes, and shoulders on structural benches

Distinguishing characteristics: Has more sand and less clay throughout the profile

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

4—Catamount gravelly coarse sandy loam, 5 to 20 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees

Elevation: 8,000 to 10,000 feet (2,438 to 3,048 meters)

Average annual precipitation: 18 to 24 inches (457 to 610 millimeters)

Average annual air temperature: 39 to 43 degrees F (4 to 6 degrees C)

Frost-free period: 50 to 70 days

Map Unit Composition

Catamount and similar soils — 90 percent
 Minor components — 10 percent

Component Description

Catamount Soils

Landform: Structural benches

Geomorphic positions: Backslopes, shoulders, and summits

Parent material: Gravelly slope alluvium and residuum weathered from granite, gneiss, and schist

Ecological site: Lodgepole pine/kinnikinnick

Slope: 5 to 20 percent

Surface fragments: About 1 percent cobbles, about 1 percent stones, and about 5 percent gravel

Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.7 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- Oi—0 to 1 inch; slightly decomposed plant material
- A—1 inch to 3 inches; gravelly coarse sandy loam
- Bw—3 to 10 inches; very gravelly coarse sandy loam
- C—10 to 14 inches; very gravelly coarse sandy loam
- Cr—14 to 24 inches; weathered bedrock

Minor Components

Legault and similar soils

- Composition:* About 5 percent
- Positions on landforms:* Summits, shoulders on structural benches
- Distinguishing characteristics:* Has more sand and less clay throughout the profile

Rock outcrop

- Composition:* About 5 percent
- Positions on landforms:* Summits, shoulders on structural benches
- Distinguishing characteristics:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

5—Catamount-Bullwark-Rock outcrop complex, 10 to 40 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees

Elevation: 8,000 to 9,900 feet (2,438 to 3,018 meters)

Average annual precipitation: 18 to 24 inches (457 to 610 millimeters)

Average annual air temperature: 37 to 42 degrees F (3 to 6 degrees C)

Frost-free period: 50 to 70 days

Map Unit Composition

- Catamount and similar soils — 45 percent
- Bullwark and similar soils — 30 percent
- Rock outcrop — 15 percent
- Minor components — 10 percent

Component Description

Catamount Soils

Landform: Structural benches

Geomorphic positions: Shoulders and backslopes

Parent material: Gravelly slope alluvium and residuum weathered from granite, schist, and gneiss

Ecological site: Lodgepole pine/kinnikinnick

Slope: 10 to 40 percent

Surface fragments: About 4 percent cobbles and about 10 percent gravel

Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.7 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- Oi—0 to 1 inch; slightly decomposed plant material
- A—1 inch to 3 inches; gravelly coarse sandy loam
- Bw—3 to 10 inches; very gravelly coarse sandy loam
- C—10 to 14 inches; very gravelly coarse sandy loam
- Cr—14 to 24 inches; weathered bedrock

Bullwark Soils

Landform: Mountain slopes

Geomorphic positions: Footslopes and backslopes

Parent material: Colluvium and residuum weathered from granite, gneiss, and schist

Ecological site: Lodgepole pine/kinnikinnick

Slope: 10 to 40 percent

Surface fragments: About 1 percent stones, about 2 percent cobbles, and about 10 percent gravel

Depth to restrictive feature: Bedrock (paralithic) — 20 to 40 inches; bedrock (lithic) — 30 to 50 inches

Drainage class: Well drained
Slowest permeability class: Moderate
Available water capacity: About 1.3 inches
 (Very low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

Oi—0 to 2 inches; slightly decomposed
 plant material
 E—2 to 9 inches; very gravelly coarse
 sandy loam
 E and Bt1—9 to 15 inches; very
 gravelly sandy loam
 E and Bt2—15 to 23 inches; very
 cobbly sandy loam
 Cr—23 to 32 inches; weathered
 bedrock
 R—32 to 60 inches; unweathered
 bedrock

Rock outcrop

Description: Rock outcrop consists of
 weathered escarpments and near
 vertical cliffs of exposed granite,
 gneiss, and schist.

Landform: Mountain slopes

Geomorphic positions: Summits and
 shoulders

Slope: 10 to 40 percent

Slowest permeability class: Impermeable

Minor Components

Legault and similar soils

Composition: About 10 percent

Positions on landforms: Backslopes,
 shoulders on structural benches

Distinguishing characteristics: Has
 more sand and less clay
 throughout the profile

A typical soil description with range in
 characteristics is included, in alphabetical
 order in the "Classification of the Soils"
 section. See "Chemical Properties of Soils,"
 "Physical Properties of Soils," and
 "Engineering Index Properties" tables for
 component horizon data.

**6—Enentah very stony loam, 10
 to 40 percent slopes**

Map Unit Setting

General location: Dense forests in the
 western part of the survey area
Native vegetation: Mainly spruce and fir
 trees

Elevation: 9,000 to 10,950 feet (2,743 to
 3,337 meters)

Average annual precipitation: 26 to 40
 inches (660 to 1,016 millimeters)

Average annual air temperature: 37 to 42
 degrees F (3 to 5 degrees C)

Frost-free period: 20 to 50 days

Map Unit Composition

Enentah and similar soils — 85 percent
 Minor components — 15 percent

Component Description

Enentah Soils

Landforms: Moraines and glaciated
 mountain slopes

Geomorphic positions: Footslopes and
 backslopes

Parent material: Loamy colluvium and till
 derived from granite, gneiss, and schist

Ecological site: Subalpine fir-Engelmann
 spruce/grouse whortleberry

Slope: 10 to 40 percent

Surface fragments: About 2 percent
 boulders, about 25 percent cobbles,
 and about 2 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively
 drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.6 inches
 (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

E—0 to 6 inches; very stony loam
 Bs1—6 to 20 inches; very cobbly loam

Bs2—20 to 34 inches; extremely cobbly
 loam

Bw—34 to 56 inches; extremely cobbly
 sandy loam

BC—56 to 72 inches; extremely cobbly
 sandy loam

Minor Components

Fallriver and similar soils

Composition: About 10 percent

Positions on landforms: Backslopes on mountain slopes, moraines
Distinguishing characteristics: Soils are more acid

Hiamovi and similar soils

Composition: About 5 percent
Position on landform: Shoulders on mountain slopes
Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

7—Enentah-Rubble land complex, 25 to 70 percent slopes

Map Unit Setting

General location: Dense forests of the Never Summer Range
Native vegetation: Mainly spruce and fir trees
Elevation: 9,000 to 11,000 feet (2,743 to 3,353 meters)
Average annual precipitation: 26 to 40 inches (660 to 1,016 millimeters)
Average annual air temperature: 37 to 41 degrees F (3 to 5 degrees C)
Frost-free period: 20 to 50 days

Map Unit Composition

Enentah and similar soils — 70 percent
 Rubble land — 15 percent
 Minor components — 15 percent

Component Description

Enentah Soils

Landform: Glaciated mountain slopes
Geomorphic position: Backslopes
Parent material: Loamy colluvium and till derived from granite, gneiss, and schist
Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry
Slope: 25 to 50 percent
Surface fragments: About 2 percent boulders, about 2 percent stones, about

25 percent cobbles, and about 10 percent gravel

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.6 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

E—0 to 6 inches; very stony loam
 Bs1—6 to 20 inches; very cobbly loam
 Bs2—20 to 34 inches; extremely cobbly loam
 Bw—34 to 56 inches; extremely cobbly sandy loam
 BC—56 to 72 inches; extremely cobbly sandy loam

Rubble land

Description: Rubble land consists of areas of talus accumulations of granite, gneiss, and schist on steep backslopes.

Landform: Mountain slopes

Geomorphic position: Backslopes

Slope: 25 to 70 percent

Surface fragments: About 40 percent angular cobbles, about 45 percent angular stones, and about 5 percent angular boulders

Slowest permeability class: Very rapid

Available water capacity: About 0.0 inch (Very low)

Minor Components

Fallriver and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Soils are more acid

Hiamovi and similar soils

Composition: About 5 percent

Positions on landforms: Backslopes, shoulders on mountain slopes

Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

Rock outcrop

Composition: About 5 percent

Position on landform: On mountain slopes

Distinguishing characteristics: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

8—Fallriver gravelly sandy loam, 10 to 45 percent slopes

Map Unit Setting

General location: High precipitation forests throughout the survey area

Native vegetation: Mainly spruce and fir trees

Elevation: 9,000 to 11,800 feet (2,743 to 3,597 meters)

Average annual precipitation: 24 to 40 inches (610 to 1,016 millimeters)

Average annual air temperature: 36 to 40 degrees F (2 to 4 degrees C)

Frost-free period: 20 to 50 days

Map Unit Composition

Fallriver and similar soils — 90 percent
Minor components — 10 percent

Component Description

Fallriver Soils

Landforms: Glaciated mountain slopes, moraines

Geomorphic positions: Backslopes, footslopes

Parent material: Colluvium and till derived from granite, gneiss, and schist

Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry

Slope: 10 to 45 percent

Surface fragments: About 1 percent stones and about 1 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 3.3 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 9 inches; gravelly sandy loam

Bs1—9 to 21 inches; very cobbly sandy loam

Bs2—21 to 35 inches; very cobbly sandy loam

BC—35 to 63 inches; very gravelly coarse sandy loam

Minor Components

Tonahutu and similar soils

Composition: About 5 percent

Positions on landforms: Backslopes, footslopes on mountain slopes

Distinguishing characteristics: Has a clay enriched subsoil (lamellae)

Tileston and similar soils

Composition: About 5 percent

Positions on landforms: Backslopes, footslopes on mountain slopes

Distinguishing characteristics: Has a clay enriched subsoil

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

9—Fallriver gravelly sandy loam, warm, 10 to 45 percent slopes

Map Unit Setting

General location: Dense forests throughout the survey area

Native vegetation: Mainly pine trees

Elevation: 9,000 to 11,800 feet (2,743 to 3,597 meters)

Average annual precipitation: 24 to 40 inches (610 to 1,016 millimeters)
Average annual air temperature: 36 to 40 degrees F (2 to 4 degrees C)
Frost-free period: 20 to 50 days

Map Unit Composition

Fallriver and similar soils — 90 percent
 Minor components — 10 percent

Component Description

Fallriver Soils

Landforms: Glaciated mountain slopes, moraines
Geomorphic positions: Backslopes, footslopes
Parent material: Colluvium and till derived from granite, gneiss, and schist
Ecological site: Lodgepole pine/grouse whortleberry
Slope: 10 to 45 percent
Surface fragments: About 1 percent stones and about 1 percent cobbles
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Slowest permeability class: Moderately rapid
Available water capacity: About 3.3 inches (Low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

Oe—0 to 2 inches; moderately decomposed plant material
 E—2 to 9 inches; gravelly sandy loam
 Bs1—9 to 21 inches; very cobbly sandy loam
 Bs2—21 to 35 inches; very cobbly sandy loam
 BC—35 to 63 inches; very gravelly coarse sandy loam

Minor Components

Enentah and similar soils
Composition: About 5 percent
Positions on landforms: Backslopes, footslopes on mountain slopes
Distinguishing characteristics: Soils are less acid

Hiamovi and similar soils
Composition: About 5 percent
Position on landform: Shoulders on mountain slopes

Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

10—Fallriver-Hiamovi complex, 10 to 55 percent slopes

Map Unit Setting

General location: High precipitation forests in the western part of the survey area
Native vegetation: Mainly spruce, fir, and pine trees
Elevation: 9,000 to 11,800 feet (2,743 to 3,597 meters)
Average annual precipitation: 26 to 40 inches (660 to 1,016 millimeters)
Average annual air temperature: 36 to 40 degrees F (2 to 4 degrees C)
Frost-free period: 20 to 50 days

Map Unit Composition

Fallriver and similar soils — 50 percent
 Hiamovi and similar soils — 30 percent
 Minor components — 20 percent

Component Description

Fallriver Soils

Landforms: Glaciated mountain slopes, moraines
Geomorphic positions: Backslopes, footslopes

Parent material: Colluvium and till derived from granite, gneiss, and schist
Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry
Slope: 10 to 55 percent
Surface fragments: About 1 percent stones and about 1 percent cobbles
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Slowest permeability class: Moderately rapid

Available water capacity: About 3.3 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- Oe—0 to 2 inches; moderately decomposed plant material
- E—2 to 9 inches; gravelly sandy loam
- Bs1—9 to 21 inches; very cobbly sandy loam
- Bs2—21 to 35 inches; very cobbly sandy loam
- BC—35 to 63 inches; very gravelly coarse sandy loam

Hiamovi Soils

Landform: Glaciated mountain slopes

Geomorphic positions: Shoulders and backslopes

Parent material: Gravelly till and residuum weathered from granite, gneiss, and schist

Ecological site: Lodgepole pine/grouse whortleberry

Slope: 20 to 55 percent

Surface fragments: About 10 percent stones, about 10 percent boulders, about 3 percent cobbles, and about 2 percent gravel

Depth to restrictive feature: Bedrock (lithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.5 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- E—0 to 5 inches; extremely gravelly sandy loam
- Bw—5 to 13 inches; extremely gravelly sandy loam
- R—13 to 60 inches; unweathered bedrock

Minor Components

Rock outcrop

Composition: About 8 percent

Positions on landforms: Backslopes, shoulders on mountain slopes

Distinguishing characteristics: Areas of exposed bedrock

Enentah and similar soils

Composition: About 7 percent

Positions on landforms: Backslopes, footslopes on mountain slopes

Distinguishing characteristics: Soils are less acid

Bullwark and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

11—Fallriver-Rock outcrop complex, 30 to 70 percent slopes

Map Unit Setting

General location: High precipitation forests throughout the survey area

Native vegetation: Mainly spruce and fir trees

Elevation: 9,000 to 11,800 feet (2,743 to 3,597 meters)

Average annual precipitation: 24 to 40 inches (610 to 1,016 millimeters)

Average annual air temperature: 36 to 40 degrees F (2 to 4 degrees C)

Frost-free period: 20 to 50 days

Map Unit Composition

Fallriver and similar soils — 60 percent

Rock outcrop — 25 percent

Minor components — 15 percent

Component Description

Fallriver Soils

Landforms: Glaciated mountain slopes and moraines

Geomorphic positions: Footslopes and backslopes

Parent material: Colluvium and till derived from granite, gneiss, and schist

Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry

Slope: 30 to 55 percent

Surface fragments: About 1 percent cobbles and about 1 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 3.3 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 9 inches; gravelly sandy loam

Bs1—9 to 21 inches; very cobbly sandy loam

Bs2—21 to 35 inches; very cobbly sandy loam

BC—35 to 63 inches; very gravelly coarse sandy loam

Rock outcrop

Description: Rock outcrop consists of exposed granite, gneiss, and schist.

Landform: Mountain slopes

Geomorphic positions: Backslopes and shoulders

Slope: 30 to 70 percent

Surface fragments: None noted

Slowest permeability class: Impermeable

Minor Components

Rubble land

Composition: About 10 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Areas of accumulated cobbles, stones, and boulders (talus)

Hiamovi and similar soils

Composition: About 5 percent

Positions on landforms: Backslopes, shoulders on mountain slopes

Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

12—Galuche-Rock outcrop complex, 20 to 90 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees with grasses, forbs, and shrubs

Elevation: 7,800 to 9,800 feet (2,378 to 2,987 meters)

Average annual precipitation: 16 to 22 inches (406 to 559 millimeters)

Average annual air temperature: 42 to 46 degrees F (5 to 7 degrees C)

Frost-free period: 75 to 95 days

Map Unit Composition

Galuche and similar soils — 55 percent

Rock outcrop — 30 percent

Minor components — 15 percent

Component Description

Galuche Soils

Landform: Mountain slopes

Geomorphic positions: Shoulders, backslopes, and summits

Parent material: Slope alluvium and gravelly residuum weathered from granite, schist, and gneiss

Ecological site: Ponderosa pine-Rocky Mountain Douglas fir/mountain muhly

Slope: 20 to 90 percent

Surface fragments: About 7 percent cobbles, about 5 percent gravel, and about 8 percent stones

Depth to restrictive feature: Bedrock (lithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 1.1 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- Oe—0 to 1 inch; moderately decomposed plant material
- A—1 inch to 3 inches; very gravelly sandy loam
- E—3 to 9 inches; very gravelly sandy loam
- Bw—9 to 19 inches; very gravelly sandy loam
- R—19 to 60 inches; unweathered bedrock

Rock outcrop

Description: Rock outcrop consists of nearly vertical cliffs and escarpments of exposed granite, gneiss, and schist.

Landform: Mountain slopes

Geomorphic positions: Backslopes and summits

Slope: 20 to 90 percent

Slowest permeability class: Impermeable

Minor Components

Cathedral and similar soils

Composition: About 10 percent

Positions on landforms: Backslopes, footslopes on mountain slopes

Distinguishing characteristics: Has a dark surface layer

Chasmfalls and similar soils

Composition: About 5 percent

Positions on landforms: Backslopes, footslopes on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

13—Granite very gravelly coarse sandy loam, 30 to 60 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine, fir, and spruce trees

Elevation: 8,000 to 10,000 feet (2,438 to 3,048 meters)

Average annual precipitation: 20 to 24 inches (508 to 610 millimeters)

Average annual air temperature: 38 to 41 degrees F (3 to 5 degrees C)

Frost-free period: 50 to 70 days

Map Unit Composition

Granite and similar soils — 85 percent

Minor components — 15 percent

Component Description

Granite Soils

Landform: Mountain slopes

Geomorphic position: Backslopes

Parent material: Colluvium derived from gneiss, granite, and schist

Ecological site: Lodgepole pine/common juniper

Slope: 30 to 60 percent

Surface fragments: About 2 percent boulders, about 2 percent stones, and about 5 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Well drained

Slowest permeability class: Moderate

Available water capacity: About 4.2 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- Oe—0 to 3 inches; moderately decomposed plant material
- E—3 to 8 inches; very gravelly coarse sandy loam
- E/B—8 to 21 inches; extremely gravelly coarse sandy loam
- Bt—21 to 43 inches; very gravelly sandy clay loam
- BC—43 to 65 inches; very gravelly sandy clay loam

Minor Components

Bullwark and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Catamount and similar soils

Composition: About 5 percent

Position on landform: Shoulders on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

Nanita and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Has more sand and less clay throughout the profile and does not have a clay enriched subsoil

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

14—Hiamovi-Rock outcrop complex, 5 to 40 percent slopes

Map Unit Setting

General location: Spur ridges at or above timberline

Native vegetation: Mainly stunted pine and spruce trees

Elevation: 9,900 to 12,000 feet (3,018 to 3,658 meters)

Average annual precipitation: 26 to 40 inches (660 to 1,016 millimeters)

Average annual air temperature: 36 to 39 degrees F (2 to 4 degrees C)

Frost-free period: 15 to 40 days

Map Unit Composition

Hiamovi and similar soils — 55 percent

Rock outcrop — 30 percent

Minor components — 15 percent

Component Description

Hiamovi Soils

Landform: Glaciated mountain slopes

Geomorphic positions: Shoulders, summits

Parent material: Gravelly slope alluvium and residuum weathered from granite, gneiss, and schist

Ecological site: Limber pine/common juniper

Slope: 5 to 40 percent

Surface fragments: About 5 percent gravel, about 15 percent cobbles, and about 15 percent stones

Depth to restrictive feature: Bedrock (lithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.5 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

E—0 to 5 inches; extremely gravelly sandy loam

Bw—5 to 13 inches; extremely gravelly sandy loam

R—13 to 60 inches; unweathered bedrock

Rock outcrop

Description: Rock outcrop consists of exposed granite, gneiss, and schist.

Landform: Mountain slopes

Geomorphic position: Backslopes

Slope: 5 to 40 percent

Slowest permeability class: Impermeable

Minor Components

Trailridge and similar soils

Composition: About 5 percent

Positions on landforms: Summits, shoulders on mountain slopes

Distinguishing characteristics: Has a dark surface layer and soft bedrock at depths of less than 20 inches

Archrock and similar soils

Composition: About 5 percent

Positions on landforms: Shoulders, summits on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Mummy and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Soil depth is greater than 60 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

15—Hiamovi-Rock outcrop complex, 15 to 80 percent slopes

Map Unit Setting

General location: The western part of the survey area

Native vegetation: Mainly spruce, fir, and pine trees

Elevation: 9,000 to 11,000 feet (2,743 to 3,353 meters)

Average annual precipitation: 26 to 40 inches (660 to 1,016 millimeters)

Average annual air temperature: 36 to 42 degrees F (2 to 5 degrees C)

Frost-free period: 10 to 50 days

Map Unit Composition

Hiamovi and similar soils — 50 percent

Rock outcrop — 30 percent

Minor components — 20 percent

Component Description

Hiamovi Soils

Landform: Glaciated mountain slopes

Geomorphic positions: Shoulders, backslopes

Parent material: Gravelly slope alluvium and residuum weathered from gneiss, schist, and granite

Ecological site: Lodgepole pine/grouse whortleberry

Slope: 15 to 65 percent

Surface fragments: About 2 percent stones, about 2 percent cobbles, and about 5 percent boulders

Depth to restrictive feature: Bedrock (lithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.4 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

E—0 to 5 inches; extremely gravelly sandy loam

Bw—5 to 13 inches; extremely gravelly sandy loam

R—13 to 60 inches; unweathered bedrock

Rock outcrop

Description: Rock outcrop consists of weathered escarpments and nearly vertical cliffs of exposed granite, gneiss, and schist.

Landform: Mountain slopes

Geomorphic positions: Backslopes, shoulders

Slope: 15 to 80 percent

Slowest permeability class: Impermeable

Minor Components

Fallriver and similar soils

Composition: About 10 percent

Positions on landforms: Backslopes, footslopes on mountain slopes

Distinguishing characteristics: Soil depth is greater than 60 inches

Catamount and similar soils

Composition: About 5 percent

Positions on landforms: Backslopes, shoulders on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

Legault and similar soils

Composition: About 5 percent

Positions on landforms: Backslopes, shoulders on mountain slopes

Distinguishing characteristics: More sand and less clay throughout the profile and soft bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and

"Engineering Index Properties" tables for component horizon data.

16—Isolation gravelly sandy loam, 5 to 35 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees, grasses, and shrubs

Elevation: 8,000 to 9,000 feet (2,438 to 2,743 meters)

Average annual precipitation: 16 to 22 inches (407 to 559 millimeters)

Average annual air temperature: 41 to 44 degrees F (5 to 7 degrees C)

Frost-free period: 70 to 100 days

Map Unit Composition

Isolation and similar soils — 90 percent

Minor components — 10 percent

Component Description

Isolation Soils

Landform: Moraines

Geomorphic positions: Footslopes, shoulders, and backslopes

Parent material: Sandy and gravelly till derived from granite, gneiss, and schist

Ecological site: Ponderosa pine/mountain muhly

Slope: 5 to 35 percent

Surface fragments: About 5 percent cobbles, about 25 percent gravel, and about 2 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.6 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oi—0 to 1 inch; slightly decomposed plant material

A1—1 inch to 6 inches; gravelly sandy loam

A2—6 to 11 inches; very gravelly sandy loam

E and Bt—11 to 24 inches; extremely cobbly sandy loam

Bt and E—24 to 33 inches; extremely gravelly sandy loam

2BC—33 to 39 inches; extremely gravelly coarse sand

2C1—39 to 51 inches; very gravelly coarse sand

3C2—51 to 72 inches; loamy coarse sand

Minor Components

Isolation, nonstony surface, and similar soils

Composition: About 5 percent

Positions on landform: Footslopes, backslopes, and shoulders on moraines

Distinguishing characteristics: Do not have rock fragments on the surface

Lumpyridge and similar soils

Composition: About 5 percent

Positions on landforms: Toeslopes, footslopes on moraines

Distinguishing characteristics: Has fewer rock fragments

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

17—Kawuneeche loam, 0 to 1 percent slope

Map Unit Setting

General location: Wet meadows of Moraine and Horseshoe Parks

Native vegetation: Mainly grasses, forbs, and shrubs suited to wet conditions

Elevation: 8,000 to 9,000 feet (2,438 to 2,743 meters)

Average annual precipitation: 18 to 24 inches (457 to 610 millimeters)

Average annual air temperature: 36 to 42 degrees F (3 to 5 degrees C)
Frost-free period: 50 to 75 days

Map Unit Composition

Kawuneeche and similar soils — 90 percent
 Minor components — 10 percent

Component Description

Kawuneeche Soils

Landform: Flood plains
Geomorphic position: None assigned
Parent material: Alluvium over sandy and gravelly glaciofluvial deposits derived from granite, gneiss, and schist
Ecological site: Tufted hairgrass/sedge sp.
Slope: 0 to 1 percent
Surface fragments: About 8 percent gravel
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Slowest permeability class: Moderate
Available water capacity: About 3.4 inches (Low)
Flooding hazard: Occasional
Ponding hazard: None
Water table: Present

Typical profile:

A1—0 to 6 inches; loam
 A2—6 to 12 inches; loam
 Bg—12 to 20 inches; gravelly sandy loam
 Cg1—20 to 35 inches; gravelly loamy fine sand
 2Cg2—35 to 61 inches; extremely gravelly coarse sand

Minor Components

Kawuneeche mucky peat and similar soils
Composition: About 5 percent
Position on landform: On flood plain
Distinguishing characteristics: Has an organic layer on the surface

Lumpyridge and similar soils

Composition: About 5 percent
Position on landform: Footslopes on fans
Distinguishing characteristics: Does not have a water table

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and

"Engineering Index Properties" tables for component horizon data.

18—Kawuneeche mucky peat, 0 to 4 percent slopes

Map Unit Setting

General location: Wet meadows in the western part of the survey area
Native vegetation: Mainly grasses, forbs, and shrubs suited to wet conditions
Elevation: 8,000 to 9,000 feet (2,438 to 2,743 meters)
Average annual precipitation: 24 to 32 inches (610 to 813 millimeters)
Average annual air temperature: 36 to 42 degrees F (3 to 5 degrees C)
Frost-free period: 40 to 60 days

Map Unit Composition

Kawuneeche and similar soils — 90 percent
 Minor components — 10 percent

Component Description

Kawuneeche Soils

Landform: Flood plains
Geomorphic position: None assigned
Parent material: Alluvium over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss
Ecological site: Planeleaf willow/water sedge
Slope: 0 to 4 percent
Surface fragments: About 5 percent gravel
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Slowest permeability class: Moderate
Available water capacity: About 5.9 inches (Moderate)
Flooding hazard: Frequent
Ponding hazard: None
Water table: Present

Typical profile:

Oe—0 to 5 inches; mucky peat
 A—5 to 12 inches; clay loam
 Bg—12 to 23 inches; loam
 Cg1—23 to 31 inches; coarse sandy loam
 2Cg2—31 to 66 inches; very gravelly loamy sand

Minor Components

Venable and similar soils
Composition: About 5 percent

Position on landform: All positions on flood plain

Distinguishing characteristics: More clay and less acid

Dystrocryepts and similar soils

Composition: About 5 percent

Position on landform: Footslopes on fans

Distinguishing characteristics: Deeper to a seasonal high water table

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

19—Kawuneeche mucky peat, low precipitation, 0 to 1 percent slope

Map Unit Setting

General location: Wet meadows of Moraine Park and Horseshoe Park

Native vegetation: Mainly grasses, forbs, and shrubs suited to wet conditions

Elevation: 8,000 to 8,600 feet (2,438 to 2,621 meters)

Average annual precipitation: 18 to 24 inches (457 to 610 millimeters)

Average annual air temperature: 36 to 42 degrees F (3 to 5 degrees C)

Frost-free period: 50 to 75 days

Map Unit Composition

Kawuneeche and similar soils — 90 percent

Minor components — 10 percent

Component Description

Kawuneeche Soils

Landform: Flood plains

Geomorphic position: None assigned

Parent material: Alluvium over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Ecological site: Planeleaf willow/water sedge

Slope: 0 to 1 percent

Surface fragments: About 5 percent gravel

Depth to restrictive feature: None noted

Drainage class: Poorly drained

Slowest permeability class: Moderate

Available water capacity: About 6.0 inches (Moderate)

Flooding hazard: Frequent

Ponding hazard: None

Water table: Present

Typical profile:

Oe—0 to 5 inches; mucky peat

A—5 to 12 inches; clay loam

Bg—12 to 23 inches; loam

Cg1—23 to 31 inches; coarse sandy loam

2Cg2—31 to 66 inches; very gravelly loamy sand

Minor Components

Kawuneeche Loam and similar soils

Composition: About 9 percent

Position on landform: All positions on flood plain

Distinguishing characteristics: Deeper to a seasonal high water table, does not have an organic layer on the surface

Venable and similar soils

Composition: About 1 percent

Position on landform: All positions on flood plains

Distinguishing characteristics: Has more clay and less acid

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

20—Kawuneeche-Dystrocryepts complex, 1 to 15 percent slopes

Map Unit Setting

General location: Wet meadows in the western part of the survey area

Native vegetation: Mainly grasses, forbs, and shrubs suited to wet conditions

Elevation: 8,500 to 10,700 feet (2,591 to 3,262 meters)

Average annual precipitation: 24 to 36 inches (610 to 915 millimeters)

Average annual air temperature: 36 to 40 degrees F (3 to 5 degrees C)
Frost-free period: 40 to 60 days

Map Unit Composition

Kawuneeche and similar soils — 50 percent
 Dystrocryepts and similar soils — 40 percent
 Minor components — 10 percent

Component Description

Kawuneeche Soils

Landform: Flood plains
Geomorphic position: Toeslopes
Parent material: Alluvium over sandy and gravelly glaciofluvial deposits derived from granite, gneiss, and schist
Ecological site: Planeleaf willow/water sedge
Slope: 1 to 4 percent
Surface fragments: About 1 percent stones and about 1 percent cobbles
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Slowest permeability class: Moderate
Available water capacity: About 5.9 inches (Moderate)
Flooding hazard: Frequent
Ponding hazard: None
Water table: Present

Typical profile:

Oe—0 to 5 inches; mucky peat
 A—5 to 12 inches; clay loam
 Bg—12 to 23 inches; loam
 Cg1—23 to 31 inches; coarse sandy loam
 2Cg2—31 to 66 inches; very gravelly loamy sand

Dystrocryepts Soils

Landform: Drainageways
Geomorphic position: Footslopes
Parent material: Alluvium derived from granite, schist, and gneiss
Ecological site: Tufted hairgrass/sedge sp.
Slope: 5 to 15 percent
Surface fragments: About 1 percent cobbles and about 1 percent stones
Depth to restrictive feature: None noted
Drainage classes: Well drained, moderately well drained, and somewhat poorly drained
Slowest permeability class: Moderately rapid
Available water capacity: About 6.0 inches (Moderate)
Flooding hazard: Rare
Ponding hazard: None
Water table: Present

Typical profile:

A—0 to 8 inches; loam
 Bw1—8 to 20 inches; loam
 Bw2—20 to 30 inches; loam
 2BC—30 to 60 inches; very gravelly sandy loam

Minor Components

Venable and similar soils
Composition: About 5 percent
Position on landform: Toeslopes on flood plains
Distinguishing characteristics: Has more clay and is less acid

Terric Cryofibrists and similar soils
Composition: About 5 percent
Position on landform: Toeslopes on flood plains
Distinguishing characteristics: Has a thick organic layer

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

21—Legault very gravelly sandy loam, 15 to 45 percent slopes

Map Unit Setting

General location: The eastern part of the survey area
Native vegetation: Mainly pine trees
Elevation: 8,500 to 10,000 feet (2,591 to 3,048 meters)
Average annual precipitation: 18 to 24 inches (457 to 610 millimeters)
Average annual air temperature: 37 to 41 degrees F (3 to 5 degrees C)
Frost-free period: 50 to 75 days

Map Unit Composition

Legault and similar soils — 90 percent
 Minor components — 10 percent

Component Description

Legault Soils

Landform: Mountain slopes and structural benches

Geomorphic positions: Shoulders and backslopes

Parent material: Sandy and gravelly slope alluvium over residuum weathered from granite, gneiss, and schist

Ecological site: Lodgepole pine/kinnikinnick

Slope: 15 to 45 percent

Surface fragments: About 12 percent gravel

Depth to restrictive feature: Bedrock (paralithic) — 5 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Rapid

Available water capacity: About 0.3 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oi—0 to 1 inch; slightly decomposed plant material

A—1 inch to 3 inches; very gravelly sandy loam

E—3 to 8 inches; extremely gravelly loamy sand

EB—8 to 12 inches; extremely gravelly loamy sand

Cr—12 to 22 inches; weathered bedrock

Minor Components

Rock outcrop

Composition: About 5 percent

Positions on landform: Backslopes and shoulders on mountain slopes

Distinguishing characteristics: Areas of exposed bedrock

Bullwark and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

22—Lumpyridge gravelly coarse sandy loam, 1 to 6 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly grasses and forbs

Elevation: 7,500 to 8,700 feet (2,286 to 2,652 meters)

Average annual precipitation: 16 to 22 inches (406 to 560 millimeters)

Average annual air temperature: 43 to 46 degrees F (6 to 8 degrees C)

Frost-free period: 70 to 100 days

Map Unit Composition

Lumpyridge and similar soils — 90 percent

Minor components — 10 percent

Component Description

Lumpyridge Soils

Landform: Fans

Geomorphic position: None assigned

Parent material: Coarse-loamy alluvium derived from granite, gneiss, and schist

Ecological site: Needleandthread/mountain muhly

Slope: 1 to 6 percent

Surface fragments: About 10 percent gravel

Depth to restrictive feature: None noted

Drainage class: Well drained

Slowest permeability class: Moderate

Available water capacity: About 4.5 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A1—0 to 6 inches; gravelly coarse sandy loam

A2—6 to 11 inches; gravelly sandy loam

Bt1—11 to 25 inches; gravelly sandy loam

Bt2—25 to 39 inches; gravelly sandy clay loam

2BC—39 to 45 inches; very gravelly coarse sandy loam

2C—45 to 80 inches; very gravelly loamy coarse sand

Minor Components

Venable and similar soils*Composition:* About 5 percent*Position on landform:* Toeslopes of depressions*Distinguishing characteristics:* Has a seasonal high water table**Isolation and similar soils***Composition:* About 5 percent*Position on landform:* Backslopes on moraines*Distinguishing characteristics:* Contains more rock fragments

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

23—Lumpyridge-Rofork complex, 3 to 15 percent slopes

Map Unit Setting*General location:* The northeastern part of the survey area*Native vegetation:* Mainly grasses, shrubs, and widely spaced pine trees*Elevation:* 7,500 to 8,700 feet (2,286 to 2,652 meters)*Average annual precipitation:* 16 to 22 inches (406 to 560 millimeters)*Average annual air temperature:* 42 to 46 degrees F (5 to 8 degrees C)*Frost-free period:* 70 to 100 days**Map Unit Composition**

Lumpyridge and similar soils — 60 percent

Rofork and similar soils — 25 percent

Minor components — 15 percent

Component Description**Lumpyridge Soils***Landform:* Fans*Geomorphic position:* None assigned*Parent material:* Coarse-loamy alluvium derived from granite, gneiss, and schist*Ecological site:* Needleandthread/mountain muhly*Slope:* 3 to 15 percent*Surface fragments:* About 10 percent gravel*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Slowest permeability class:* Moderate*Available water capacity:* About 4.5 inches (Low)*Flooding hazard:* None*Ponding hazard:* None*Water table:* None*Typical profile:*

A1—0 to 6 inches; gravelly coarse sandy loam

A2—6 to 11 inches; gravelly sandy loam

Bt1—11 to 25 inches; gravelly sandy loam

Bt2—25 to 39 inches; gravelly sandy clay loam

2BC—39 to 45 inches; very gravelly coarse sandy loam

2C—45 to 80 inches; very gravelly loamy coarse sand

Rofork Soils*Landform:* Structural benches*Geomorphic positions:* Summits, shoulders, and backslopes*Parent material:* Gravelly slope alluvium and residuum weathered from granite, schist and gneiss*Ecological site:* Ponderosa pine/antelope bitterbrush*Slope:* 5 to 15 percent*Surface fragments:* About 1 percent cobbles and about 5 percent gravel*Depth to restrictive feature:* Bedrock (paralithic) — 10 to 20 inches*Drainage class:* Somewhat excessively drained*Slowest permeability class:* Moderately rapid*Available water capacity:* About 0.7 inch (Very low)*Flooding hazard:* None*Ponding hazard:* None*Water table:* None*Typical profile:*

A—0 to 5 inches; very gravelly sandy loam

Bw—5 to 10 inches; very gravelly sandy loam

C—10 to 14 inches; extremely gravelly loamy coarse sand

Cr—14 to 24 inches; weathered bedrock

Minor Components

Chasmfalls and similar soils

Composition: About 5 percent
Positions on landform: Toeslopes, footslopes on fans
Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Kawuneeche and similar soils

Composition: About 5 percent
Position on landform: Toeslopes on flood plains
Distinguishing characteristics: Has a seasonal high water table

Cathedral and similar soils

Composition: About 5 percent
Positions on landform: Summits, shoulders, and backslopes on structural benches
Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

Component Description

Mummy Soils

Landform: Glaciated mountains
Geomorphic positions: Footslopes and backslopes
Parent material: Colluvium and till derived from granite, gneiss, and schist
Ecological site: Kobresia/golden avens/rock sedge
Slope: 20 to 50 percent
Surface fragments: About 5 percent boulders, about 15 percent stones, and about 30 percent cobbles
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Slowest permeability class: Moderately rapid
Available water capacity: About 2.5 inches (Very low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

A—0 to 5 inches; extremely cobbly sandy loam
 Bw1—5 to 24 inches; extremely cobbly sandy loam

Bw2—24 to 72 inches; extremely cobbly sandy loam

24—Mummy extremely cobbly sandy loam, 20 to 50 percent slopes

Map Unit Setting

General location: Tundra
Native vegetation: Mainly alpine grasses, forbs, and shrubs
Elevation: 10,400 to 12,200 feet (3,170 to 3,719 meters)
Average annual precipitation: 30 to 40 inches (762 to 1,016 millimeters)
Average annual air temperature: 34 to 38 degrees F (1 to 3 degrees C)
Frost-free period: 10 to 30 days

Map Unit Composition

Mummy and similar soils — 85 percent
 Minor components — 15 percent

Minor Components

Archrock and similar soils

Composition: About 5 percent
Positions on landform: Shoulders and backslopes on mountains
Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Trailridge and similar soils

Composition: About 5 percent
Positions on landform: Summits and shoulders on mountains
Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

Rock outcrop*Composition:* About 5 percent*Positions on landform:* Shoulders and backslopes on mountains*Distinguishing characteristics:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

25—Mummy gravelly sandy loam, 10 to 35 percent slopes

Map Unit Setting*General location:* Tundra*Native vegetation:* Mainly alpine grasses, forbs, and shrubs*Elevation:* 10,400 to 12,200 feet (3,170 to 3,719 meters)*Average annual precipitation:* 30 to 40 inches (762 to 1,016 millimeters)*Average annual air temperature:* 34 to 38 degrees F (1 to 3 degrees C)*Frost-free period:* 10 to 30 days**Map Unit Composition**

Mummy and similar soils — 85 percent

Minor components — 15 percent

Component Description**Mummy Soils***Landform:* Glaciated mountains*Geomorphic positions:* Footslopes and backslopes*Parent material:* Colluvium and till derived from granite, gneiss, and schist*Ecological site:* Kobresia/golden avens/rock sedge*Slope:* 10 to 35 percent*Surface fragments:* About 1 percent stones, about 2 percent cobbles, and about 5 percent gravel*Depth to restrictive feature:* None noted*Drainage class:* Somewhat excessively drained*Slowest permeability class:* Moderately rapid*Available water capacity:* About 4.6 inches (Low)*Flooding hazard:* None*Ponding hazard:* None*Water table:* None*Typical profile:*

A—0 to 10 inches; gravelly sandy loam

Bw1—10 to 21 inches; very gravelly sandy loam

Bw2—21 to 63 inches; very gravelly sandy loam

Minor Components

Archrock and similar soils

Composition: About 5 percent*Positions on landform:* Shoulders, backslopes on mountains*Distinguishing characteristics:* Soft bedrock at depths of 20 to 40 inches

Trailridge and similar soils

Composition: About 5 percent*Positions on landform:* Shoulders, summits on mountains*Distinguishing characteristics:* Soft bedrock at depths of less than 20 inches**Rock outcrop***Composition:* About 5 percent*Positions on landform:* Shoulders, backslopes on mountains*Distinguishing characteristics:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

26—Nanita extremely gravelly loamy coarse sand, 30 to 60 percent slopes

Map Unit Setting*General location:* The eastern part of the survey area*Native vegetation:* Mainly pine trees*Elevation:* 9,020 to 10,000 feet (2,750 to 3,048 meters)

Average annual precipitation: 20 to 24 inches (508 to 610 millimeters)
Average annual air temperature: 37 to 42 degrees F (3 to 5 degrees C)
Frost-free period: 40 to 60 days

Map Unit Composition

Nanita and similar soils — 85 percent
 Minor components — 15 percent

Component Description

Nanita Soils

Landform: Glaciated mountain slopes
Geomorphic position: Backslopes
Parent material: Sandy and gravelly till and colluvium derived from schist, granite, and gneiss
Ecological site: Lodgepole pine/elk sedge
Slope: 30 to 60 percent
Surface fragments: About 1 percent cobbles and about 5 percent stones
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Slowest permeability class: Moderately rapid
Available water capacity: About 1.2 inches (Very low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

- Oi—0 to 1 inch; slightly decomposed plant material
- E1—1 inch to 2 inches; extremely gravelly loamy coarse sand
- E2—2 to 7 inches; extremely gravelly loamy sand
- E and Bt1—7 to 18 inches; extremely gravelly loamy sand
- E and Bt2—18 to 72 inches; extremely gravelly loamy sand

Minor Components

Bullwark and similar soils
Composition: About 5 percent
Position on landform: Backslopes on mountain slopes
Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Legault and similar soils
Composition: About 5 percent

Position on landform: Shoulders on mountain slopes
Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

Rock outcrop

Composition: About 5 percent
Position on landform: Shoulders on mountain slopes
Distinguishing characteristics: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

27—Nanita very gravelly sandy loam, 1 to 15 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees
Elevation: 8,200 to 9,020 feet (2,500 to 2,750 meters)
Average annual precipitation: 20 to 24 inches (508 to 610 millimeters)
Average annual air temperature: 36 to 42 degrees F (2 to 5 degrees C)
Frost-free period: 50 to 70 days

Map Unit Composition

Nanita and similar soils — 100 percent
 Minor components — none noted

Component Description

Nanita Soils

Landform: Moraines
Geomorphic positions: Shoulders, summits
Parent material: Sandy and gravelly till derived from schist, granite, and gneiss
Ecological site: Lodgepole pine/elk sedge
Slope: 1 to 15 percent

Surface fragments: About 1 percent cobbles, about 3 percent stones, and about 5 percent gravel

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 1.7 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oi—0 to 1 inch; slightly decomposed plant material

E—1 inch to 8 inches; very gravelly sandy loam

E and Bt1—8 to 18 inches; extremely cobbly loamy sand

E and Bt2—18 to 28 inches; extremely cobbly loamy sand

BC—28 to 72 inches; extremely cobbly sand

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

28—Nanita very gravelly sandy loam, 10 to 60 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees

Elevation: 8,200 to 10,000 feet (2,500 to 3,048 meters)

Average annual precipitation: 16 to 20 inches (406 to 508 millimeters)

Average annual air temperature: 37 to 42 degrees F (3 to 5 degrees C)

Frost-free period: 50 to 70 days

Map Unit Composition

Nanita and similar soils — 90 percent
Minor components — 10 percent

Component Description

Nanita Soils

Landform: Moraines

Geomorphic position: Backslopes

Parent material: Sandy and gravelly till derived from granite, gneiss, and schist

Ecological site: Lodgepole pine/elk sedge

Slope: 10 to 60 percent

Surface fragments: About 5 percent boulders, about 15 percent stones, and about 10 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 1.7 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oe—0 to 1 inch; moderately decomposed plant material

E1—1 inch to 10 inches; very gravelly sandy loam

E2—10 to 23 inches; extremely gravelly loamy sand

E and Bt1—23 to 41 inches; extremely gravelly sand

E and Bt2—41 to 71 inches; extremely gravelly sand

Minor Components

Nanita, nonstony surface, and similar soils

Composition: About 5 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Do not have rock fragments

Granite and similar soils

Composition: About 5 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Has a developed subsoil with a higher percentage of clay

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and

"Engineering Index Properties" tables for component horizon data.

29—Nanita-Rock outcrop complex, 10 to 40 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees

Elevation: 8,670 to 10,000 feet (2,644 to 3,048 meters)

Average annual precipitation: 20 to 24 inches (508 to 610 millimeters)

Average annual air temperature: 36 to 42 degrees F (2 to 5 degrees C)

Frost-free period: 40 to 70 days

Map Unit Composition

Nanita and similar soils — 75 percent

Rock outcrop — 15 percent

Minor components — 10 percent

Component Description

Nanita Soils

Landform: Moraines

Geomorphic position: Backslopes

Parent material: Sandy and gravelly till derived from schist, granite, and gneiss

Ecological site: Lodgepole pine/elk sedge

Slope: 10 to 40 percent

Surface fragments: About 1 percent stones and about 5 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 1.4 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oe—0 to 4 inches; moderately decomposed plant material

A—4 to 6 inches; gravelly sandy loam

E1—6 to 15 inches; very gravelly loamy sand

E2—15 to 26 inches; very gravelly sand

E and Bt—26 to 43 inches; extremely cobbly loamy sand

BC—43 to 71 inches; extremely gravelly sand

Rock outcrop

Description: Rock outcrop consists of exposed granite, gneiss, and schist.

Landform: Moraines

Geomorphic position: Shoulders

Slope: 20 to 40 percent

Slowest permeability class: Impermeable

Minor Components

Bullwark and similar soils

Composition: About 5 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Legault and similar soils

Composition: About 3 percent

Position on landform: Shoulders on moraines

Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

Rubble land

Composition: About 2 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Areas of accumulated cobbles, stones, and boulders (talus)

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

30—Onahu-Terric Cryofibrists-Trailridge complex, 2 to 35 percent slopes

Map Unit Setting

General location: Tundra below snow fields

Native vegetation: Mainly alpine grasses, forbs, and shrubs

Elevation: 11,000 to 12,200 feet (3,353 to 3,718 meters)

Average annual precipitation: 30 to 40 inches (760 to 1016 millimeters)
Average annual air temperature: 32 to 38 degrees F (0 to 3 degrees C)
Frost-free period: 10 to 30 days

Map Unit Composition

Onahu and similar soils — 35 percent
 Terric Cryofibrists and similar soils — 25 percent
 Trailridge and similar soils — 20 percent
 Minor components — 20 percent

Component Description

Onahu Soils

Landforms: Glaciated mountain slopes and cirques
Geomorphic positions: Backslopes, footslopes
Parent material: Loamy alluvium over gravelly till derived from granite, gneiss, and schist
Ecological site: Tufted hairgrass/marshmarigold
Slope: 2 to 25 percent
Surface fragments: About 5 percent boulders, about 2 percent stones, and about 1 percent cobbles
Depth to restrictive feature: Bedrock (paralithic) — 40 to 60 inches
Drainage class: Poorly drained
Slowest permeability class: Moderate
Available water capacity: About 3.9 inches (Low)
Flooding hazard: None
Ponding hazard: None
Water table: Present
Typical profile:
 A1—0 to 7 inches; loam
 A2—7 to 16 inches; loam
 2Bg—16 to 24 inches; very gravelly sandy loam
 2Cg—24 to 45 inches; very gravelly sandy loam
 3Cr—45 to 55 inches; weathered bedrock

Terric Cryofibrists Soils

Landform: Cirques
Geomorphic positions: Footslopes and toeslopes
Parent material: Herbaceous organic material over till and loamy alluvium derived from granite, gneiss, and schist
Ecological site: Planeleaf willow/water sedge
Slope: 2 to 7 percent

Surface fragments: About 10 percent gravel, about 1 percent stones, and about 2 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Slowest permeability class: Moderate

Available water capacity: About 9.1 inches (High)

Flooding hazard: None

Ponding hazard: Occasional

Water table: Present

Typical profile:

Oi—0 to 19 inches; peat
 Oa—19 to 21 inches; muck
 Ag—21 to 32 inches; loam
 Cg1—32 to 53 inches; stratified loamy sand to loam
 Cg2—53 to 60 inches; very gravelly sandy loam

Trailridge Soils

Landform: Mountains
Geomorphic positions: Shoulders, summits
Parent material: Gravelly slope alluvium and residuum weathered from schist, gneiss, and granite
Ecological site: Golden avens/rock sedge
Slope: 15 to 35 percent
Surface fragments: About 1 percent stones and about 5 percent cobbles
Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches
Drainage class: Somewhat excessively drained
Slowest permeability class: Moderately rapid
Available water capacity: About 0.7 inch (Very low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

A1—0 to 6 inches; extremely gravelly sandy loam
 A2—6 to 11 inches; extremely gravelly sandy loam
 Bw—11 to 19 inches; extremely gravelly coarse sandy loam
 Cr—19 to 29 inches; weathered bedrock

Minor Components

Mummy and similar soils
Composition: About 5 percent

Position on landform: Backslopes on mountains

Distinguishing characteristics: Soil depth is greater than 60 inches and does not have a water table

Rock outcrop

Composition: About 5 percent

Positions on landform: Shoulders, backslopes on mountains

Distinguishing characteristics: Areas of exposed bedrock

Archrock and similar soils

Composition: About 5 percent

Positions on landform: Shoulders, backslopes on mountains

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches and does not have a water table

Fallriver and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Do not have a dark surface layer or a water table

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

31—Peeler loam, 5 to 40 percent slopes

Map Unit Setting

General location: The western part of the survey area at lower elevations

Native vegetation: Mainly pine trees

Elevation: 8,000 to 9,000 feet (2,438 to 2,743 meters)

Average annual precipitation: 22 to 26 inches (559 to 660 millimeters)

Average annual air temperature: 36 to 42 degrees F (3 to 5 degrees C)

Frost-free period: 30 to 70 days

Map Unit Composition

Peeler and similar soils — 90 percent
Minor components — 10 percent

Component Description

Peeler Soils

Landforms: Glaciated mountain slopes and moraines

Geomorphic positions: Footslopes, backslopes

Parent material: Loamy till

Ecological site: Lodgepole pine/grouse whortleberry

Slope: 5 to 40 percent

Surface fragments: None noted

Depth to restrictive feature: None noted

Drainage class: Well drained

Slowest permeability class: Moderately slow

Available water capacity: About 7.8 inches (High)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 10 inches; loam

B/E—10 to 22 inches; sandy clay loam (Bt part)

B/E—10 to 22 inches; loam (E part)

Bt—22 to 40 inches; sandy clay loam

BC—40 to 62 inches; gravelly sandy clay loam

Minor Components

Tonahutu and similar soils

Composition: About 5 percent

Positions on landform: Footslopes, backslopes on moraines

Distinguishing characteristics: Have more rock fragments

Fallriver and similar soils

Composition: About 5 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Have more rock fragments and does not have a clay enriched subsoil

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and

"Engineering Index Properties" tables for component horizon data.

32—Rock outcrop-Cathedral complex, 20 to 100 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly open stands of pine with grasses and shrubs

Elevation: 8,000 to 9,100 feet (2,438 to 2,774 meters)

Average annual precipitation: 18 to 22 inches (457 to 559 millimeters)

Average annual air temperature: 42 to 44 degrees F (5 to 7 degrees C)

Frost-free period: 75 to 100 days

Map Unit Composition

Rock outcrop — 45 percent

Cathedral and similar soils — 40 percent

Minor components — 15 percent

Component Description

Rock outcrop

Description: Rock outcrop consists of rounded escarpments and nearly vertical cliffs of exposed granite, gneiss, and schist.

Landform: Mountain slopes

Geomorphic positions: Shoulders and backslopes

Slope: 20 to 100 percent

Slowest permeability class: Impermeable

Cathedral Soils

Landform: Mountain slopes

Geomorphic position: Backslopes

Parent material: Gravelly slope alluvium and residuum weathered from granite, gneiss, and schist

Ecological site: Ponderosa pine/antelope bitterbrush

Slope: 20 to 80 percent

Surface fragments: About 10 percent gravel

Depth to restrictive feature: Bedrock (lithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.8 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A—0 to 9 inches; very gravelly sandy loam

Bw—9 to 15 inches; extremely gravelly sandy loam

R—15 to 60 inches; unweathered bedrock

Minor Components

Chasmfalls and similar soils

Composition: About 10 percent

Positions on landform: Footslopes, backslopes on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Legault and similar soils

Composition: About 5 percent

Positions on landform: Shoulders, backslopes on mountain slopes

Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

33—Rock outcrop-Rubble land complex, 30 to 200 percent slopes

Map Unit Setting

General location: At or above timberline

Native vegetation: This map unit mainly is void of vegetation.

Elevation: 9,970 to 13,460 feet (3,040 to 4,104 meters)

Average annual precipitation: 30 to 40 inches (750 to 1,016 millimeters)

Average annual air temperature: 30 to 41 degrees F (-1 to 5 degrees C)
Frost-free period: 10 to 30 days

Map Unit Composition

Rock outcrop — 40 percent
 Rubble land — 30 percent
 Minor components — 30 percent

Component Description

Rock outcrop

Description: Rock outcrop consists of nearly vertical cliffs and escarpments of exposed granite, gneiss, and schist.
Landform: Mountain slopes
Geomorphic positions: Backslopes, summits, and shoulders
Slope: 30 to 200 percent
Slowest permeability class: Impermeable

Rubble land

Description: Rubble land consists of talus accumulations of granite, gneiss, and schist.
Landform: Mountains
Geomorphic position: Backslopes
Slope: 30 to 200 percent
Surface fragments: About 45 percent angular stones, about 40 percent angular cobbles, and about 5 percent angular boulders
Slowest permeability class: Very rapid
Available water capacity: About 0.0 inch (Very low)

Minor Components

Archrock and similar soils
Composition: About 10 percent
Position on landform: Backslopes on mountains
Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Mummy and similar soils
Composition: About 10 percent
Position on landform: Backslopes on mountains
Distinguishing characteristics: Soil depth is greater than 60 inches

Trailridge and similar soils
Composition: About 5 percent
Positions on landform: Shoulders, summits on mountains

Distinguishing characteristics: Soft bedrock at depths of less than 20 inches

Water

Composition: About 5 percent
Distinguishing characteristics: Small lakes, ponds, and streams

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

34—Rock outcrop-Rubble land-Enentah complex, 40 to 200 percent slopes

Map Unit Setting

General location: On the eastern slopes of the survey area near timberline

Native vegetation: Mainly spruce and fir trees
Elevation: 9,000 to 10,900 feet (2,743 to 3,322 meters)
Average annual precipitation: 26 to 36 inches (660 to 915 millimeters)
Average annual air temperature: 36 to 39 degrees F (2 to 4 degrees C)
Frost-free period: 20 to 50 days

Map Unit Composition

Rock outcrop — 30 percent
 Rubble land — 30 percent
 Enentah and similar soils — 25 percent
 Minor components — 15 percent

Component Description

Rock outcrop

Description: Rock outcrop consists of escarpments and nearly vertical cliffs of exposed granite, gneiss, and schist.
Landform: Mountain slopes
Geomorphic positions: Backslopes, shoulders
Slope: 40 to 200 percent
Slowest permeability class: Impermeable

Rubble land

Description: Rubble land consists of talus accumulations of granite, gneiss, and schist.

Landform: Mountain slopes

Geomorphic position: Backslopes

Slope: 40 to 200 percent

Surface fragments: About 45 percent angular stones, about 40 percent angular cobbles, and about 5 percent angular boulders

Slowest permeability class: Very rapid

Available water capacity: About 0.0 inch (Very low)

Enentah Soils

Landform: Glaciated mountain slopes

Geomorphic position: Backslopes

Parent material: Loamy colluvium and till derived from granite, gneiss, and schist

Ecological site: Lodgepole pine/grouse whortleberry

Slope: 40 to 70 percent

Surface fragments: About 5 percent gravel, about 5 percent cobbles, and about 10 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.6 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

E—0 to 6 inches; very stony loam

Bs1—6 to 20 inches; very cobbly loam

Bs2—20 to 34 inches; extremely cobbly loam

Bw—34 to 56 inches; extremely cobbly sandy loam

BC—56 to 72 inches; extremely cobbly sandy loam

Minor Components

Hiamovi and similar soils

Composition: About 10 percent

Positions on landform: Backslopes, shoulders on mountain slopes

Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

Fallriver and similar soils

Composition: About 5 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Soil is more acid

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

35—Rofork-Chasmfalls complex, 5 to 35 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees, grasses, and shrubs

Elevation: 7,700 to 9,000 feet (2,348 to 2,743 meters)

Average annual precipitation: 16 to 22 inches (406 to 560 millimeters)

Average annual air temperature: 40 to 43 degrees F (4 to 6 degrees C)

Frost-free period: 70 to 90 days

Map Unit Composition

Rofork and similar soils — 60 percent

Chasmfalls and similar soils — 30 percent

Minor components — 10 percent

Component Description

Rofork Soils

Landforms: Structural benches and mountain slopes

Geomorphic positions: Summits, shoulders, and backslopes

Parent material: Gravelly slope alluvium and residuum weathered from granite, gneiss, and schist

Ecological site: Ponderosa pine/antelope bitterbrush

Slope: 5 to 35 percent

Surface fragments: About 1 percent cobbles and about 5 percent gravel

Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.7 inch
(Very low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

- A—0 to 5 inches; very gravelly sandy loam
- Bw—5 to 10 inches; very gravelly sandy loam
- C—10 to 14 inches; extremely gravelly loamy coarse sand
- Cr—14 to 24 inches; weathered bedrock

Chasmfalls Soils

Landform: Mountain slopes
Geomorphic positions: Footslopes and backslopes

Parent material: Coarse-loamy slope alluvium and gravelly residuum weathered from granite, gneiss, and schist

Ecological site: Ponderosa pine/antelope bitterbrush

Slope: 5 to 25 percent

Surface fragments: About 5 percent gravel

Depth to restrictive feature: Bedrock (paralithic) — 20 to 40 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.4 inches
(Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- A1—0 to 4 inches; gravelly sandy loam
- A2—4 to 13 inches; gravelly coarse sandy loam
- Bw—13 to 19 inches; gravelly sandy loam
- BC—19 to 28 inches; gravelly sandy loam
- Cr—28 to 38 inches; weathered bedrock

Minor Components

Rock outcrop

Composition: About 5 percent
Positions on landform: Backslopes, shoulders on mountain slopes
Distinguishing characteristics: Areas of exposed bedrock

Lumpyridge and similar soils

Composition: About 5 percent
Positions on landform: Toeslopes, footslopes on mountain slopes
Distinguishing characteristics: Soil depth is greater than 60 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and

"Engineering Index Properties" tables for component horizon data.

36—Rofork-Isolation complex, 5 to 35 percent slopes

Map Unit Setting

General location: The eastern part of the survey area

Native vegetation: Mainly pine trees, grasses, and shrubs

Elevation: 8,000 to 9,000 feet (2,438 to 2,743 meters)

Average annual precipitation: 16 to 22 inches (406 to 559 millimeters)

Average annual air temperature: 40 to 44 degrees F (4 to 7 degrees C)

Frost-free period: 70 to 100 days

Map Unit Composition

Rofork and similar soils — 60 percent
Isolation and similar soils — 30 percent
Minor components — 10 percent

Component Description

Rofork Soils

Landforms: Structural benches and mountain slopes

Geomorphic positions: Shoulders, summits, and backslopes

Parent material: Gravelly slope alluvium and residuum weathered from granite, schist, and gneiss

Ecological site: Ponderosa pine/antelope bitterbrush

Slope: 5 to 35 percent

Surface fragments: About 5 percent gravel and about 1 percent cobbles

Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.7 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A—0 to 5 inches; very gravelly sandy loam

Bw—5 to 10 inches; very gravelly sandy loam

C—10 to 14 inches; extremely gravelly loamy coarse sand

Cr—14 to 24 inches; weathered bedrock

Isolation Soils

Landform: Moraines

Geomorphic positions: Shoulders, footslopes, and backslopes

Parent material: Sandy and gravelly till derived from granite, gneiss, and schist

Ecological site: Ponderosa pine/mountain muhly

Slope: 5 to 35 percent

Surface fragments: About 5 percent cobbles, about 2 percent stones, and about 25 percent gravel

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.6 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oi—0 to 1 inch; slightly decomposed plant material

A1—1 inch to 6 inches; gravelly sandy loam

A2—6 to 11 inches; very gravelly sandy loam

E and Bt—11 to 24 inches; extremely cobbly sandy loam

Bt and E—24 to 33 inches; extremely gravelly sandy loam

2BC—33 to 39 inches; extremely gravelly coarse sand

2C1—39 to 51 inches; very gravelly coarse sand

3C2—51 to 72 inches; loamy coarse sand

Minor Components

Rock outcrop

Composition: About 5 percent

Position on landform: Shoulders on moraines

Distinguishing characteristics: Areas of exposed bedrock

Venable and similar soils

Composition: About 5 percent

Positions on landform: Toeslopes, footslopes on moraines

Distinguishing characteristics: Have a seasonal high water table

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

37—Rubble land, 20 to 65 percent slopes

Map Unit Setting

General location: At the intersection of the Fall and Roaring Rivers

Native vegetation: This map unit mainly is void of vegetation.

Elevation: 8,500 to 9,800 feet (2,591 to 2,987 meters)

Average annual precipitation: 20 to 28 inches (506 to 711 millimeters)

Average annual air temperature: 37 to 41 degrees F (3 to 5 degrees C)

Frost-free period: 30 to 70 days

Map Unit Composition

Rubble land — 95 percent
 Minor components — 5 percent

Component Description**Rubble land**

Description: Rubble land consists of talus accumulations of granite, gneiss, and schist.

Landform: Fans

Geomorphic positions: Backslopes and footslopes

Slope: 20 to 65 percent

Surface fragments: About 45 percent angular stones, about 5 percent angular boulders, and about 40 percent angular cobbles

Slowest permeability class: Very rapid

Available water capacity: About 0.0 inch (Very low)

Minor Components

Soils similar to Nanita but with little or no vegetation

Composition: About 5 percent

Positions on landform: Backslopes, footslopes on fans

Distinguishing characteristics: Areas of accumulated sand, silt, and clay

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

38—Terric Cryofibrists, 0 to 2 percent slopes**Map Unit Setting**

General location: Wet meadows

Native vegetation: Mainly grasses, forbs, and shrubs suited to wet conditions

Elevation: 8,200 to 10,000 feet (2,499 to 3,048 meters)

Average annual precipitation: 24 to 40 inches (610 to 1,016 millimeters)

Average annual air temperature: 34 to 38 degrees F (1 to 3 degrees C)

Frost-free period: 30 to 60 days

Map Unit Composition

Terric Cryofibrists and similar soils — 90 percent

Minor components — 10 percent

Component Description**Terric Cryofibrists Soils**

Landform: Flood plains

Geomorphic position: None assigned

Parent material: Herbaceous organic material over loamy alluvium and till derived from granite, gneiss, and schist

Ecological site: Planeleaf willow/water sedge

Slope: 0 to 2 percent

Surface fragments: None noted

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Slowest permeability class: Moderate

Available water capacity: About 9.1 inches (High)

Flooding hazard: Frequent

Ponding hazard: None

Water table: Present

Typical profile:

Oi—0 to 19 inches; peat

Oa—19 to 21 inches; muck

Ag—21 to 32 inches; loam

Cg1—32 to 53 inches; stratified loamy sand to loam

Cg2—53 to 60 inches; very gravelly sandy loam

Minor Components

Venable and similar soils

Composition: About 10 percent

Position on landform: Flood plain

Distinguishing characteristics: Do not have an organic layer on the surface

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

39—Tileston very cobbly sandy loam, 10 to 40 percent slopes**Map Unit Setting**

General location: Dense forests in the western part of the survey area

Native vegetation: Mainly spruce and fir trees
Elevation: 9,000 to 10,500 feet (2,743 to 3,201 meters)
Average annual precipitation: 24 to 40 inches (610 to 1,016 millimeters)
Average annual air temperature: 36 to 42 degrees F (3 to 5 degrees C)
Frost-free period: 30 to 70 days

Map Unit Composition

Tileston and similar soils — 85 percent
 Minor components — 15 percent

Component Description

Tileston Soils

Landforms: Moraines and glaciated mountain slopes
Geomorphic position: Backslopes
Parent material: Colluvium and till derived from granite, gneiss, and schist
Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry

Slope: 10 to 40 percent
Surface fragments: About 2 percent stones, about 2 percent boulders, and about 5 percent cobbles
Depth to restrictive feature: None noted
Drainage class: Well drained
Slowest permeability class: Moderate
Available water capacity: About 2.9 inches (Low)
Flooding hazard: None
Ponding hazard: None
Water table: None

Typical profile:

Oe—0 to 3 inches; moderately decomposed plant material
 E—3 to 7 inches; very cobbly sandy loam
 E/B—7 to 13 inches; very gravelly sandy loam, very gravelly sandy clay loam
 B/E—13 to 28 inches; extremely cobbly sandy clay loam, extremely cobbly sandy loam
 Bt—28 to 36 inches; extremely cobbly sandy clay loam
 BC—36 to 64 inches; extremely cobbly sandy loam

Minor Components

Fallriver and similar soils
Composition: About 10 percent
Position on landform: Backslopes on mountain slopes
Distinguishing characteristics: Do not have a clay enriched subsoil

Hiamovi and similar soils
Composition: About 5 percent
Positions on landform: Backslopes, shoulders on mountain slopes
Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

40—Tonahutu very gravelly sandy loam, 15 to 30 percent slopes

Map Unit Setting

General location: Dense forests in the western part of the survey area
Native vegetation: Mainly spruce, pine, and fir trees
Elevation: 8,700 to 10,900 feet (2,652 to 3,322 meters)
Average annual precipitation: 24 to 34 inches (610 to 864 millimeters)
Average annual air temperature: 38 to 42 degrees F (3 to 5 degrees C)
Frost-free period: 30 to 70 days

Map Unit Composition

Tonahutu and similar soils — 85 percent
 Minor components — 15 percent

Component Description

Tonahutu Soils

Landform: Moraines
Geomorphic position: Backslopes
Parent material: Gravelly till derived from granite, gneiss, and schist
Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry

Slope: 15 to 30 percent

Surface fragments: About 1 percent stones and about 10 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Well drained

Slowest permeability class: Moderate

Available water capacity: About 2.4 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- Oe—0 to 1 inch; moderately decomposed plant material
- E—1 inch to 6 inches; very gravelly sandy loam
- E and Bt1—6 to 21 inches; very gravelly sandy loam
- E and Bt2—21 to 35 inches; very gravelly sandy loam
- Bt and E—35 to 45 inches; very gravelly sandy clay loam
- BC—45 to 62 inches; very gravelly loamy sand

Minor Components

Fallriver and similar soils

Composition: About 5 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Do not have a clay enriched subsoil

Enentah and similar soils

Composition: About 5 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Do not have a clay enriched subsoil and is less acid

Bullwark and similar soils

Composition: About 5 percent

Position on landform: Backslopes on moraines

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

41—Tonahutu very gravelly sandy loam, 30 to 50 percent slopes

Map Unit Setting

General location: Dense forests throughout the survey area

Native vegetation: Mainly spruce, pine, and fir trees

Elevation: 8,700 to 11,000 feet (2,652 to 3,353 meters)

Average annual precipitation: 24 to 34 inches (610 to 864 millimeters)

Average annual air temperature: 38 to 42 degrees F (3 to 5 degrees C)

Frost-free period: 30 to 70 days

Map Unit Composition

Tonahutu and similar soils — 90 percent

Minor components — 10 percent

Component Description

Tonahutu Soils

Landform: Moraines

Geomorphic position: Backslopes

Parent material: Gravelly till derived from granite, gneiss, and schist

Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry

Slope: 30 to 50 percent

Surface fragments: About 5 percent stones and about 10 percent cobbles

Depth to restrictive feature: None noted

Drainage class: Well drained

Slowest permeability class: Moderate

Available water capacity: About 2.4 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

- Oe—0 to 1 inch; moderately decomposed plant material
- E—1 inch to 6 inches; very gravelly sandy loam
- E and Bt1—6 to 21 inches; very gravelly sandy loam
- E and Bt2—21 to 35 inches; very gravelly sandy loam
- Bt and E—35 to 45 inches; very gravelly sandy clay loam

BC—45 to 62 inches; very gravelly loamy sand

Minor Components

Enentah and similar soils

Composition: About 5 percent

Positions on landform: Backslopes, footslopes on moraines

Distinguishing characteristics: Do not have a clay enriched subsoil and are less acid.

Hiamovi and similar soils

Composition: About 5 percent

Position on landform: Shoulders on moraines

Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

42—Trailridge-Archrock complex, 10 to 40 percent slopes

Map Unit Setting

General location: Tundra

Native vegetation: Mainly alpine grasses, forbs, and shrubs

Elevation: 10,500 to 12,500 feet (3,201 to 3,810 meters)

Average annual precipitation: 30 to 40 inches (762 to 1,016 millimeters)

Average annual air temperature: 34 to 38 degrees F (1 to 3 degrees C)

Frost-free period: 10 to 30 days

Map Unit Composition

Trailridge and similar soils — 40 percent

Archrock and similar soils — 35 percent

Minor components — 25 percent

Component Description

Trailridge Soils

Landform: Mountains

Geomorphic positions: Shoulders, summits

Parent material: Gravelly slope alluvium and residuum weathered from schist, gneiss, and granite

Ecological site: Golden avens/rock sedge

Slope: 10 to 40 percent

Surface fragments: About 10 percent stones, about 12 percent gravel, and about 5 percent cobbles

Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.7 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A1—0 to 6 inches; extremely gravelly sandy loam

A2—6 to 11 inches; extremely gravelly sandy loam

Bw—11 to 19 inches; extremely gravelly coarse sandy loam

Cr—19 to 29 inches; weathered bedrock

Archrock Soils

Landform: Mountains

Geomorphic positions: Shoulders, backslopes

Parent material: Gravelly slope alluvium over residuum weathered from schist, gneiss, and granite

Ecological site: Alpine clover/golden avens

Slope: 10 to 40 percent

Surface fragments: About 1 percent stones, about 45 percent gravel, and about 20 percent cobbles

Depth to restrictive feature: Bedrock (paralithic) — 20 to 40 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.2 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A—0 to 8 inches; gravelly loam

Bw—8 to 18 inches; very gravelly loam

2BC—18 to 25 inches; very gravelly coarse sandy loam
 2Cr—25 to 35 inches; weathered bedrock

Minor Components

Mummy and similar soils

Composition: About 10 percent

Position on landform: Backslopes on mountain slopes

Distinguishing characteristics: Soil depth is greater than 60 inches

Hiamovi and similar soils

Composition: About 10 percent

Position on landform: Shoulders on mountain slopes

Distinguishing characteristics: Hard bedrock at depths of less than 20 inches and does not have a dark surface layer

Rock outcrop

Composition: About 5 percent

Positions on landforms: Backslopes, shoulders, and summits

Distinguishing characteristics: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

43—Trailridge-Mummy complex, 20 to 60 percent slopes

Map Unit Setting

General location: Tundra

Native vegetation: Mainly alpine grasses, forbs, and shrubs

Elevation: 10,400 to 12,200 feet (3,170 to 3,718 meters)

Average annual precipitation: 30 to 40 inches (762 to 1,016 millimeters)

Average annual air temperature: 34 to 38 degrees F (1 to 3 degrees C)

Frost-free period: 10 to 30 days

Map Unit Composition

Trailridge and similar soils — 45 percent
 Mummy and similar soils — 40 percent
 Minor components — 15 percent

Component Description

Trailridge Soils

Landform: Mountains

Geomorphic positions: Shoulders, summits

Parent material: Gravelly slope alluvium and residuum weathered from schist, gneiss, and granite

Ecological site: Golden avens/rock sedge

Slope: 20 to 60 percent

Surface fragments: About 12 percent gravel, about 5 percent cobbles, and about 2 percent stones

Depth to restrictive feature: Bedrock (paralithic) — 10 to 20 inches

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 0.7 inch (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A1—0 to 6 inches; extremely gravelly sandy loam

A2—6 to 11 inches; extremely gravelly sandy loam

Bw—11 to 19 inches; extremely gravelly coarse sandy loam

Cr—19 to 29 inches; weathered bedrock

Mummy Soils

Landform: Glaciated mountains

Geomorphic positions: Footslopes and backslopes

Parent material: Colluvium and till derived from granite, gneiss, and schist

Ecological site: Kobresia/golden avens/rock sedge

Slope: 20 to 60 percent

Surface fragments: About 1 percent stones, about 2 percent cobbles, and about 15 percent gravel

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 4.6 inches (Low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

A—0 to 10 inches; gravelly sandy loam

Bw1—10 to 21 inches; very gravelly sandy loam

Bw2—21 to 63 inches; very gravelly sandy loam

Minor Components

Archrock and similar soils

Composition: About 10 percent

Positions on landform: Summits, shoulders on mountains

Distinguishing characteristics: Soft bedrock at depths of 20 to 40 inches

Rubble land

Composition: About 3 percent

Positions on landform: Backslopes, footslopes on mountains

Distinguishing characteristics: Areas of accumulated cobbles, stones, and boulders (talus)

Rock outcrop

Composition: About 2 percent

Position on landform: On mountains

Distinguishing characteristics: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

44—Venable loam, 0 to 1 percent slope

Map Unit Setting

General location: Wet meadows in the eastern part of the survey area

Native vegetation: Mainly grasses, forbs, and shrubs suited to wet conditions

Elevation: 8,200 to 9,000 feet (2,499 to 2,743 meters)

Average annual precipitation: 16 to 24 inches (406 to 610 millimeters)

Average annual air temperature: 38 to 42 degrees F (3 to 5 degrees C)

Frost-free period: 50 to 75 days

Map Unit Composition

Venable and similar soils — 90 percent

Minor components - 10 percent

Component Description

Venable Soils

Landform: Flood plains

Geomorphic position: None assigned

Parent material: Loamy alluvium derived from granite, gneiss, and schist

Ecological site: Planeleaf willow/water sedge

Slope: 0 to 1 percent

Surface fragments: None noted

Depth to restrictive feature: None noted

Drainage class: Poorly drained

Slowest permeability class: Moderately slow

Available water capacity: About 6.4 inches (Moderate)

Flooding hazard: Occasional

Ponding hazard: None

Water table: Present

Typical profile:

Oe—0 to 3 inches; moderately decomposed plant material

A—3 to 9 inches; loam

Ag—9 to 14 inches; loam

Bg—14 to 31 inches; sandy clay loam

2Cg—31 to 43 inches; gravelly loamy coarse sand

3Cg—43 to 63 inches; very cobbly silty clay loam

Minor Components

Kawuneeche Soils

Composition: About 10 percent

Positions on landform: Footslopes and toeslopes

Distinguishing characteristics: Have less clay and are more acid

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

45—Ypsilon gravelly coarse sandy loam, 20 to 50 percent slopes

Map Unit Setting

General location: Near timberline in the northern part of the survey area

Native vegetation: Mainly spruce and fir trees

Elevation: 9,700 to 11,000 feet (2,957 to 3,353 meters)

Average annual precipitation: 30 to 40 inches (762 to 1,016 millimeters)

Average annual air temperature: 35 to 38 degrees F (2 to 4 degrees C)

Frost-free period: 20 to 50 days

Map Unit Composition

Ypsilon and similar soils — 90 percent

Minor components — 10 percent

Component Description

Ypsilon Soils

Landforms: Glaciated mountain slopes, moraines

Geomorphic positions: Backslopes and footslopes

Parent material: Colluvium and till derived from granite, gneiss, and schist

Ecological site: Subalpine fir-Engelmann spruce/grouse whortleberry

Slope: 20 to 50 percent

Surface fragments: About 1 percent boulders, about 5 percent cobbles, and about 1 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Slowest permeability class: Moderately rapid

Available water capacity: About 2.2 inches (Very low)

Flooding hazard: None

Ponding hazard: None

Water table: None

Typical profile:

Oe—0 to 6 inches; moderately decomposed plant material

E1—6 to 14 inches; gravelly coarse sandy loam

E2—14 to 19 inches; very cobbly coarse sandy loam

Bs1—19 to 24 inches; very cobbly coarse sandy loam

Bs2—24 to 35 inches; extremely stony sandy loam

BC—35 to 67 inches; extremely cobbly loamy coarse sand

Minor Components

Fallriver and similar soils

Composition: About 5 percent

Positions on landforms: Footslopes, backslopes on mountain slopes, and moraines

Distinguishing characteristics: Do not have significant accumulations of iron and aluminum in the subsoil

Hiamovi and similar soils

Composition: About 5 percent

Positions on landform: Backslopes, shoulders on mountain slopes

Distinguishing characteristics: Hard bedrock at depths of less than 20 inches

A typical soil description with range in characteristics is included, in alphabetical order in the "Classification of the Soils" section. See "Chemical Properties of Soils," "Physical Properties of Soils," and "Engineering Index Properties" tables for component horizon data.

46—Water

Map Unit Setting

General location: Throughout the survey area

Elevation: 8,000 to 12,500 feet (2,438 to 3,811 meters)

Average annual precipitation: 18 to 40 inches (457 to 1,016 millimeters)

Average annual air temperature: 34 to 41 degrees F (1 to 5 degrees C)

Map Unit Composition

Description: Water consists of lakes, ponds, streams, and rivers throughout the survey area.

Use and Management of the Soils

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

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

Information in this section can be used to plan the use and management of soils for pasture; as woodland; as sites for buildings, sanitary facilities, roads, and other transportation systems; for 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 in harmony with the natural soil. Planners 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 logging or in excavation. They can also use the survey to plan the safe disposal of wastes and to locate sites for pavements, sidewalks, and campgrounds.

Ecological Sites and Characteristic Native Vegetation

Table 1 shows the ecological site classification for each soil and the characteristic plants in the potential native plant community.

The *Ecological Site Name* is the plant association name from the Plant Associations of Region Two, Rocky Mountain Region, U.S.D.A., Forest Service (U.S.D.A., Forest Service, 1987). During the field work for this soil survey, the native plant community was observed for each soil. A recognized plant association from the referenced publication was correlated to the observed plant community. The plant association name consists of common names of plant species that dominate the plant community at the climax stage of plant succession. A combination of plants from the various layers of the plant community (tree, shrub, forb, or grass layer) is used in the name. Where two plants are used in the name, they are separated by a slash (/). The slash commonly separates plants of different layers. Where three plants are used, the two plants that are of the same layer are separated by a dash (-).

Characteristic Native Vegetation lists the common names of the potential native plant community that is characteristic of the named soil. Where the potential native vegetation is forest, the common trees in the forest overstory are listed. The column *Shrubs, Forbs and Grasses* lists the characteristic plants in the understory of forested soils, or in the entire plant community of non-forested soils. This list is not a comprehensive list of all the plants that were observed or that may be expected to occur in the plant community; it includes only the typical and most significant plants. Tree seedlings are not included. The table also lists the *composition*, by percentage of air-dry weight, of each kind of plant. These values were obtained by ocular estimates at representative sites. Detailed plant inventories were not conducted. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of

woodland in which the production of wood crops is highest.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 8 and 9 show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

Slightly limited indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected.

Somewhat limited indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

Very limited indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil

at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility.

Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

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

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The

properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table,

ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

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

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

Sanitary Facilities

Tables 6 and 7 show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can

be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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

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

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

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

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

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

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

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in 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, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6

feet. For deeper trenches, onsite investigation may be needed.

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

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

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

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

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

Daily cover for landfill is the soil material that is used to cover compacted solid waste

in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in 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, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

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

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

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

Recreation

The soils of the survey area are rated in tables 2 and 3 according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

Very limited indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of

the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in tables 2 and 3 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties

that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas.

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

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

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

when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

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

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

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

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 ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics. These procedures follow the Soil Survey Laboratory Methods Manual (USDA-NRCS, 1996). These results are reported in Table 11.

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

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

Engineering Index Properties

Table 8 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

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

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

appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998).

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in Table 9.

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 oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

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

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

Physical and Chemical Properties

Tables 9 and 10 show estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In Table 9, 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 (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or

10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. 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 Table 9, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Erosion factors are shown in Table 9 as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

Erosion factor K_f 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.

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

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

Soil Features

Table 11 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 for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not

insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

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

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

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

Water Features

Table 12 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

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

gravelly sands. These soils have a high rate of water transmission.

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

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

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

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

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

Water table refers to a saturated zone in the soil. Table 12 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. The upper and lower limits indicate the normal range in thickness of the saturated zone. Depth is given to the nearest half foot. The upper limit indicates the highest water level. ">6.0" in the column showing the lower limit 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. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil (Vepraskas, M.J. 1994). A saturated zone

that lasts for less than a month is not considered a water table. Months and water table depths are listed only if observations

were made in that month, or could be reliably predicted for that month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 12 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

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

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

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

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

Also considered 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.

Classification Of The Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 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 13 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 Cryalf (*Cry*, meaning cold, 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 Glossocryalfs (*Glosso*, meaning a tongue, a degradation of an argillic horizon, plus *cry*, the suborder of the Alfisols that has a cryic temperature 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

adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Glossocryalfs.

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 loamy-skeletal, mixed, superactive Typic Glossocryalfs.

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" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1999) and in "Keys to Soil Taxonomy" (USDA, 1999). Unless otherwise indicated, colors in the descriptions are for dry 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."

Archrock Series

Depth class: Moderately deep

Drainage class: Somewhat excessively drained

any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The

Parent material: Slope alluvium over residuum from granite, gneiss, and schist
Landform: Mountains
Landform position: Backslopes, shoulders, and summits
Slope: 10 to 40 percent
Elevation: 10,500 to 12,500 feet
Average annual precipitation: 30 to 40 inches
Average annual air temperature: 34 to 38 degrees F
Frost-free period: 10 to 30 days

Taxonomic class: Loamy-skeletal, paramicaceous Humic Dystrocrypts

Typical pedon

Archrock gravelly loam, in an area of Trailridge-Archrock complex, 10 to 40 percent slopes, about 0.8 mile southeast of Milner Pass in Rocky Mountain National Park; USGS Fall River Pass topographic quadrangle; latitude 40 degrees, 24 minutes, 54 seconds N; and longitude 105 degrees, 48 minutes, 01 second W, NAD 1927.

A—0 to 8 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots throughout; 25 percent gravel; very strongly acid (pH 4.8); abrupt wavy boundary.

Bw—8 to 18 inches; brownish yellow (10YR 6/6) very gravelly loam, dark yellowish brown (10YR 4/6) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine and few medium roots throughout; 50 percent gravel; strongly acid (pH 5.3); abrupt smooth boundary.

2BC—18 to 25 inches; light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots throughout; 40 percent gravel and 15 percent cobbles; very strongly acid (pH 4.8).

2Cr—25 to 35 inches; soft schist.

Range in Characteristics

Soil moisture regime: Udic

Average annual soil temperature: 33 to 37 degrees F
Average summer soil temperature: 43 to 47 degrees F
Depth to paralithic contact: 20 to 40 inches
Thickness of the umbric epipedon: 7 to 20 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent
Sand content: 45 to 70 percent
Mica content: 40 to 70 percent
Rock fragment content: 35 to 50 percent, dominantly gravel

A Horizon:

Hue: 7.5YR or 10YR
Value: 3 to 5 dry, 2 or 3 moist
Chroma: 1 to 3
Clay content: 10 to 18 percent
Rock fragment content: 15 to 35 percent, dominantly gravel
Base saturation: 10 to 40 percent
Reaction: very strongly acid or strongly acid

Bw Horizon:

Hue: 7.5YR or 10YR
Value: 4 to 6 dry, 3 to 5 moist
Chroma: 4 to 6
Clay content: 10 to 18 percent
Texture: very gravelly loam, very gravelly sandy loam
Rock fragment content: 35 to 60 percent, dominantly gravel
Base saturation: 10 to 50 percent
Reaction: very strongly acid to moderately acid

2BC Horizon: (2C Horizon in some pedons)

Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 to 6
Clay content: 5 to 18 percent
Texture: very gravelly coarse sandy loam, very gravelly sandy loam
Rock fragment content: 35 to 60 percent, dominantly gravel
Reaction: very strongly acid to moderately acid

Bullwark Series

Depth class: Moderately deep
Drainage class: Well drained
Parent material: Colluvium and residuum from granite, gneiss, and schist

Landform: Mountain slopes

Landform position: Backslopes, footslopes

Slope: 5 to 50 percent

Elevation: 8,000 to 9,900 feet

Average annual precipitation: 18 to 24 inches

Average annual air temperature: 38 to 42 degrees F

Frost-free period: 50 to 70 days

Taxonomic class: Loamy-skeletal, paramicaceous Lamellic Eutrocrypts

Typical pedon

Bullwark very gravelly coarse sandy loam, in an area of Bullwark-Catamount complex, 20 to 50 percent slopes, about 3.2 miles west of the McGraw Ranch entrance in Rocky Mountain National Park; USGS Estes Park topographic quadrangle; latitude 40 degrees, 2 minutes, 34 seconds N; longitude 105 degrees, 33 minutes, 38 seconds W, NAD 1927.

Oi—0 to 2 inches; slightly decomposed plant material.

E—2 to 9 inches; light gray (10YR 7/2) very gravelly coarse sandy loam; brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common medium and coarse roots and many very fine and fine roots; 25 percent gravel and 10 percent cobbles and 3 percent stones; slightly acid (pH 6.4); clear wavy boundary.

E and Bt1—9 to 15 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, brown (10YR 5/3) moist (E); weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and few medium roots; 25 percent gravel and 10 percent cobbles; moderately acid (pH 5.6); lamellae of yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist (Bt); weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; total lamellae thickness of 1.0 inches; moderately acid (pH 5.6); clear wavy boundary.

E and Bt2—15 to 23 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist (E); weak medium subangular blocky structure; soft, very

friable, slightly sticky and nonplastic; few fine and medium roots; 20 percent gravel and 15 percent cobbles and 3 percent stones; moderately acid (pH 5.6); lamellae of yellowish brown (10YR 5/4) very cobbly sandy clay loam, dark yellowish brown (10YR 4/4) moist (Bt); weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; total thickness of lamellae is 4.5 inches; moderately acid (pH 5.6); clear wavy boundary.

Cr—23 to 32 inches; soft decomposed granite and gneiss.

R—32 to 60 inches; hard granite and gneiss.

Range in Characteristics

(Depths are given from the mineral soil surface)

Soil moisture regime: Udic bordering on ustic

Average annual soil temperature: 36 to 40 degrees F

Average summer soil temperature: 43 to 47 degrees F

Thickness of lamellae: 3 to 6 inches

Thickness of the cambic horizon: 13 to 25 inches

Depth to paralithic contact: 20 to 40 inches

Particle-size control section (weighted average):

Clay content: 10 to 18 percent

Sand content: 55 to 70 percent

Rock fragments: 35 to 60 percent

Mica content: 40 to 60 percent mica (by grain count)

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 8 to 18 percent

Rock fragments: 35 to 50 percent

Reaction: moderately acid or slightly acid

E and Bt Horizons:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist (E)

Value: 5 or 6 dry, 4 or 5 moist (Bt)

Chroma: 2 or 3 (E)

Chroma: 3 through 6 (Bt)

Clay content: 10 to 27 percent

Texture: very gravelly coarse sandy loam, very gravelly sandy loam, very cobbly sandy loam, very cobbly sandy clay loam

Base saturation: 70 to 90 percent

Rock fragments: 35 to 60 percent

Reaction: moderately acid or slightly acid

Lamellae content: the number of lamellae increases with depth

Catamount Series

Depth class: Shallow

Drainage class: Somewhat excessively drained

Parent material: Slope alluvium and residuum from granite, gneiss, and schist

Landform: Structural benches

Landform position: Backslopes, summits, and shoulders

Slope: 5 to 40 percent

Elevation: 8,000 to 10,000 feet

Average annual precipitation: 18 to 24 inches

Average annual air temperature: 37 to 43 degrees F

Frost-free period: 50 to 70 days

Taxonomic class: Loamy-skeletal, paramicaceous, shallow Ustic Dystrocryepts

Typical pedon

Catamount gravelly coarse sandy loam, in an area of Catamount gravelly coarse sandy loam, 5 to 20 percent slopes, about 6 miles northwest of north boundary trailhead in Rocky Mountain National Park; USGS Estes Park topographic quadrangle; latitude 40 degrees, 27 minutes, 45 seconds N; longitude 105 degrees, 31 minutes, 44 seconds W, NAD 1927.

Oi—0 inches to 1 inch; slightly decomposed plant material.

A—1 inch to 3 inches; brown (10YR 5/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 30 percent gravel; strongly acid (pH 5.4); abrupt smooth boundary.

Bw—3 to 10 inches; brown (10YR 5/3) very gravelly coarse sandy loam, dark

yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 40 percent gravel; strongly acid (pH 5.2); abrupt smooth boundary.

BC—10 to 14 inches; light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/6) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 55 percent gravel; strongly acid (pH 5.2); abrupt irregular boundary.

Cr—14 to 24 inches; soft weathered gneiss and schist.

Range in Characteristics

(Depths are given from the mineral soil surface)

Soil moisture regime: Udic bordering on ustic

Mean annual soil temperature: 40 to 44 degrees F

Mean summer soil temperature: 46 to 49 degrees F

Depth to paralithic contact: 10 to 20 inches

Depth to cambic horizon: 3 to 6 inches

Thickness of the cambic horizon: 6 to 10 inches

Particle-size control section (weighted average):

Clay content: 5 to 18 percent

Sand content: 55 to 70 percent

Rock fragments: 35 to 60 percent

Mica content: 35 to 60 percent mica (by grain count)

A Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: gravelly coarse sandy loam, very gravelly coarse sandy loam

Clay content: 5 to 18 percent

Reaction: strongly acid to slightly acid

Bw Horizon:

Hue: 7.5YR or 10YR

Value: 5 through 7 dry, 4 or 5 moist

Chroma: 3 through 6

Texture: very gravelly coarse sandy loam, very gravelly sandy loam

Clay content: 5 to 18 percent

Rock fragments: 40 to 60 percent

Reaction: strongly acid to slightly acid

Base saturation: 50 to 70 percent

BC Horizon:

Hue: 7.5YR or 10YR

Value: 5 through 7 dry, 4 or 5 moist

Chroma: 3 through 6

Texture: very gravelly coarse sandy loam, very gravelly sandy loam

Clay content: 5 to 18 percent

Rock fragments: 35 to 60 percent

Reaction: strongly acid or moderately acid

Base saturation: 30 to 60 percent

Cathedral Series

Depth class: Shallow

Drainage class: Somewhat excessively drained

Parent material: Slope alluvium from granite, gneiss, and schist

Landform: Mountain slopes

Landform position: South-facing backslopes

Slope: 20 to 80 percent

Elevation: 8,000 to 9,100 feet

Average annual precipitation: 18 to 22 inches

Average annual air temperature: 42 to 44 degrees F

Frost-free period: 75 to 100 days

Taxonomic class: Loamy-skeletal, paramicaceous, frigid Lithic Haplustolls

Typical pedon

Cathedral very gravelly sandy loam, in an area of Rock outcrop-Cathedral complex, 20 to 100 percent slopes, about 300 feet north and 2,600 feet west of the southeast corner of sec. 31, T 5 N, R 73 W; USGS Longs Peak topographic quadrangle; latitude 40 degrees, 21 minutes, 6 seconds N; longitude 105 degrees, 37 minutes, 10 seconds W, NAD 1927.

A—0 to 9 inches; brown (7.5YR 4/2) very gravelly sandy loam, black (7.5YR 2/1) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium and coarse; 45 percent gravel and 5 percent cobbles; moderately acid (pH 6.0); abrupt wavy boundary.

Bw—9 to 15 inches; brown (7.5YR 5/3) extremely gravelly sandy loam, brown (7.5YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine to coarse roots and many very fine; 50 percent gravel and 15 percent cobbles; moderately acid (pH 6.0); abrupt irregular boundary.

R—15 to 60 inches; hard granite.

Range in Characteristics

Soil moisture regime: Ustic

Depth to lithic contact: 10 to 20 inches

Thickness of the mollic epipedon: 7 to 16 inches

Particle-size control section (weighted average):

Clay content: 8 to 15 percent

Sand content: 55 to 70 percent

Rock fragments: 55 to 75 percent

Mica content: 40 to 60 percent mica (by grain count)

A Horizon:

Hue: 7.5YR or 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 1 through 3

Clay content: 8 to 18 percent

Rock fragments: 35 to 60 percent, dominantly gravel

Base saturation: 60 to 80 percent

Reaction: moderately acid to neutral

Bw Horizon:

Hue: 7.5YR or 10YR

Value: 4 or 5 dry, 2 through 4 moist

Chroma: 2 through 4

Clay content: 5 to 18 percent

Texture: extremely gravelly sandy loam, extremely gravelly coarse sandy loam

Rock fragments: 35 to 75 percent, dominantly gravel

Base saturation: 60 to 100 percent
Reaction: moderately acid to neutral

Chasmfalls Series

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Parent material: Slope alluvium and residuum from granite, schist, and gneiss
Landform: Mountain slopes
Landform position: Backslopes and footslopes
Slope: 5 to 25 percent
Elevation: 7,700 to 9,000 feet
Average annual precipitation: 16 to 22 inches
Average annual air temperature: 40 to 43 degrees F
Frost-free period: 70 to 90 days

Taxonomic class: Coarse-loamy, paramicaceous, frigid Pachic Haplustolls

Typical pedon

Chasmfalls gravelly sandy loam, in an area of Rofork-Chasmfalls complex, 5 to 35 percent slopes about 1,300 feet south and 400 feet west of the northeast corner of sec. 30, T 5 N, R 73 W; USGS Estes Park topographic quadrangle; latitude 40 degrees, 22 minutes, 34 seconds N; longitude 105 degrees, 36 minutes, 31 seconds W, NAD 1927.

A1—0 to 4 inches; very dark gray (10YR 3/1) gravelly sandy loam, black (10YR 2/1) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 15 percent gravel; slightly acid (pH 6.2); abrupt wavy boundary.

A2—4 to 13 inches; very dark grayish brown (10YR 3/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 30 percent gravel; slightly acid (pH 6.2); clear smooth boundary.

Bw—13 to 19 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard,

very friable, nonsticky and nonplastic; common very fine and fine roots; 30 percent gravel; neutral (pH 6.8); clear smooth boundary.

BC—19 to 28 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; loose, nonsticky and nonplastic; few very fine and fine roots; 20 percent gravel; neutral (pH 7.0); abrupt wavy boundary.

Cr—28 to 38 inches; soft, partially decomposed granite.

Range in Characteristics

Soil moisture regime: Ustic
Mean annual soil temperature: 40 to 43 degrees F
Mean summer soil temperature: 59 to 63 degrees F
Depth to paralithic contact: 20 to 40 inches
Thickness of the mollic epipedon: 16 to 40 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent
Sand content: 50 to 70 percent
Rock fragments: 25 to 35 percent
Mica content: 40 to 70 percent (by grain count)

A Horizons:

Hue: 7.5YR or 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 1 through 3
Texture: gravelly sandy loam or gravelly coarse sandy loam
Clay content: 8 to 18 percent
Rock fragments: 15 to 35 percent
Reaction: moderately acid to neutral

Bw Horizon:

Hue: 7.5YR or 10YR
Value: 3 through 5 dry, 2 through 3 moist
Chroma: 2 or 3
Texture: gravelly sandy loam, gravelly coarse sandy loam
Clay content: 8 to 18 percent
Rock fragments: 15 to 35 percent
Reaction: slightly acid or neutral

BC Horizon:

Hue: 7.5YR or 10YR
Value: 3 through 5 dry, 2 through 4 moist

Chroma: 2 or 4
Texture: gravelly sandy loam, gravelly coarse sandy loam
Clay content: 8 to 16 percent
Rock fragments: 15 to 35 percent
Reaction: slightly acid or neutral

Dystrocryepts

Depth class: Very deep
Drainage class: Somewhat poorly, moderately well, and well drained
Parent material: Alluvium from granite, gneiss, and schist
Landform: Drainageways
Landform position: Footslopes
Elevation: 8,500 to 10,700 feet
Slope: 5 to 15 percent
Average annual precipitation: 24 to 40 inches
Average annual air temperature: 36 to 40 degrees F
Frost-free period: 40 to 60 days

Taxonomic class: Dystrocryepts

Typical pedon

Dystrocryepts, in an area of Kawuneeche-Dystrocryepts complex, 1 to 15 percent slopes, about 0.6 mile northwest of Medicine Bow Curve; USGS Fall River topographic quadrangle; latitude 40 degrees, 27 minutes, 9 seconds N; longitude 105 degrees, 45 seconds, 51 minutes W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; strongly acid (pH 5.2); clear smooth boundary.

Bw1—8 to 20 inches; brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 10 percent gravel; strongly acid (pH 5.4); gradual smooth boundary.

Bw2—20 to 30 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, friable, slightly sticky

and slightly plastic; few fine strong brown (7.5YR 4/6) iron concentrations; few very fine and fine roots; 10 percent gravel; moderately acid (pH 5.6); abrupt smooth boundary.

2BC—30 to 60 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common medium strong brown (7.5YR 4/6) iron concentrations; few very fine and fine roots; 35 percent gravel; moderately acid (pH 5.8).

Range in Characteristics

Thickness of the umbric epipedon: 16 to 24 inches

Depth to endosaturation: 24 to 60 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent
Sand content: 40 to 60 percent
Rock fragments: 15 to 25 percent
Mica content: 15 to 30 percent

A Horizon:

Hue: 7.5YR or 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 2 or 3
Clay content: 10 to 20 percent
Reaction: very strongly acid or strongly acid
Base saturation: 30 to 50 percent

Bw Horizons:

Hue: 7.5YR or 10YR
Value: 3 to 5 dry, 2 to 4 moist
Chroma: 2 to 4
Texture: loam or sandy loam
Clay content: 10 to 18 percent
Rock fragment content: 5 to 15 percent
Reaction: very strongly acid to moderately acid
Base saturation: 30 to 50 percent

BC Horizon:

Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 to 6
Texture: very gravelly sandy loam, very gravelly loam
Clay content: 8 to 18 percent
Rock fragment content: 35 to 60 percent

Reaction: very strongly acid to moderately acid

Enentah Series

Depth class: Very deep

Drainage class: Somewhat excessively drained

Parent material: Colluvium and till derived from granite, gneiss, and schist

Landform: Moraines and glaciated mountain slopes

Landform position: Backslopes and footslopes

Slope: 10 to 70 percent

Elevation: 9,000 to 11,000 feet

Average annual precipitation: 26 to 40 inches

Average annual air temperature: 36 to 42 degrees F

Frost-free period: 20 to 50 days

Taxonomic class: Loamy-skeletal, mixed, superactive Typic Eutrocrypts

Typical pedon

Enentah very stony loam, in an area of Enentah-Rubble land complex, 25 to 70 percent slopes, about 0.3 mile north of Mesquito Creek on the Grand Ditch in Rocky Mountain National Park; USGS Fall River topographic quadrangle; latitude 40 degrees, 24 minutes, 45 seconds N; longitude 105 degrees, 51 minutes, 59 seconds W, NAD 1927.

The surface is covered with about 2 percent boulders, 2 percent stones, and 25 percent cobbles.

E—0 to 6 inches; light gray (10YR 7/2) very stony loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine to coarse roots; 20 percent gravel, 5 percent cobbles and 20 percent stones; strongly acid (pH 5.4); abrupt wavy boundary.

Bs1—6 to 20 inches; yellowish brown (10YR 5/4) very cobbly loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; 20 percent gravel, 25 percent cobbles and 10 percent

stones; moderately acid (pH 6.0); clear smooth boundary.

Bs2—20 to 34 inches; yellowish brown (10YR 5/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; 35 percent gravel and 30 percent cobbles; moderately acid (pH 5.8); gradual smooth boundary.

Bw—34 to 56 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; 35 percent gravel and 30 percent cobbles; moderately acid (pH 5.8); abrupt smooth boundary.

BC—56 to 72 inches; light yellowish brown (2.5Y 6/3) extremely cobbly sandy loam, light olive brown (2.5Y 5/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few very fine roots; 35 percent gravel and 30 percent cobbles; moderately acid (pH 5.6).

Range in Characteristics

Soil moisture regime: Udic

Mean annual soil temperature: 34 to 40 degrees F

Mean summer soil temperature: 39 to 45 degrees F

Depth to albic horizon: 0 to 4 inches

Depth to cambic horizon: 4 to 10 inches

Thickness of the cambic horizon: 34 to 60 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent

Sand content: 45 to 75 percent

Rock fragments: 45 to 65 percent gravel, cobbles, and stones

Mica content: 15 to 30 percent

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 to 8 dry, 4 to 6 moist

Chroma: 1 to 3

Clay content: 10 to 20 percent

Rock fragments: 35 to 60 percent

Base saturation: 40 to 60 percent

Reaction: strongly acid or moderately acid

Bs Horizons:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 4 to 6

Texture: extremely cobbly loam, extremely cobbly sandy loam, very cobbly loam, very cobbly sandy loam

Clay content: 8 to 18 percent

Rock fragments: 35 to 80, dominantly gravel and cobbles

Base saturation: 50 to 75 percent

Reaction: moderately acid or slightly acid

Bw Horizon:

Hue: 7.5YR or 10YR

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 2 to 4

Texture: extremely cobbly sandy loam, extremely cobbly coarse sandy loam

Clay content: 8 to 18 percent

Rock fragments: 60 to 80 percent, dominantly gravel and cobbles

Base saturation: 50 to 75 percent

Reaction: moderately acid or slightly acid

BC Horizon:

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 2 to 4

Texture: extremely cobbly sandy loam, extremely cobbly loamy sand

Clay content: 5 to 15 percent

Rock fragments: 60 to 80, dominantly gravel and cobbles

Base saturation: 40 to 75 percent

Reaction: moderately acid or slightly acid

Fallriver Series

Depth class: Very deep

Drainage class: Somewhat excessively drained

Parent material: Till and colluvium from granite, gneiss, and schist

Landform: Glaciated mountain slopes and moraines

Landform position: Backslopes and footslopes

Slope: 10 to 55 percent

Elevation: 9,000 to 11,800 feet

Average annual precipitation: 24 to 40 inches

Average annual air temperature: 36 to 40 degrees F

Frost-free period: 20 to 50 days

Taxonomic class: Loamy-skeletal, isotic, Typic Dystrocryepts

Typical pedon

Fallriver extremely cobbly sandy loam, in an area of Fallriver extremely cobbly sandy loam, 10 to 45 percent slopes, about 3.6 miles north of Grand Lake in Rocky Mountain National Park; USGS Allens Park topographic quadrangle; latitude 40 degrees, 18 minutes, 08 seconds, N; longitude 105 degrees, 49 minutes, 11 seconds W, NAD 1927.

Oe—0 to 2 inches; moderately decomposed plant material.

E—2 to 9 inches; light gray (10YR 7/2) gravelly sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many fine to coarse roots; 20 percent gravel and 5 percent cobbles; very strongly acid (pH 4.6); abrupt smooth boundary.

Bs1—9 to 21 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, yellowish brown (10YR 5/4) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots and few fine roots; few faint patchy clay films on faces of peds; few faint patchy iron stains on faces of peds; 20 percent gravel and 30 percent cobbles and 5 percent stones; very strongly acid (pH 4.8); clear smooth boundary.

Bs2—21 to 35 inches; brown (7.5YR 5/4) very cobbly sandy loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; few faint patchy clay films on faces of peds; common distinct continuous iron stains on faces of peds; 20 percent gravel and 30 percent cobbles and 5 percent stones; very strongly acid (pH 4.8); clear smooth boundary.

BC—35 to 63 inches; light yellowish brown (10YR 6/4) very gravelly coarse sandy loam,

dark yellowish brown (10YR 4/4) moist;
weak fine subangular blocky structure; soft,
very friable, slightly sticky and nonplastic; 40
percent gravel and 10 percent cobbles;
moderately acid (pH 5.6).

Range in Characteristics

(Depths are from the mineral soil surface.)

Soil moisture regime: Udic

Mean annual soil temperature: 34 to 38
degrees F

Mean summer soil temperature: 38 to 42
degrees F

Depth to cambic horizon: 4 to 12 inches

Ratio of 15-bar water/clay: 0.60 to 0.95

*Particle-size control section (weighted
average):*

Clay content: 8 to 18 percent

Sand content: 55 to 75 percent

Rock fragments: 40 to 60 percent,
dominantly gravel and cobbles

Mica content: 15 to 30 percent (by grain
content)

E Horizon:

Hue: 10YR or 7.5YR

Value: 6 or 7 dry, 4 through 6 moist

Chroma: 2 or 3

Clay content: 8 to 18 percent

Rock fragments: 15 to 35 percent

Base saturation: 20 to 50 percent

Reaction: very strongly acid or strongly
acid

Bs Horizons:

Hue: 5YR to 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 through 6

Texture: very cobbly sandy loam, very
cobbly coarse sandy loam

Clay content: 8 to 18 percent

Rock fragments: 35 to 60 percent

Aluminum oxalate extractable Al + ½

Fe: 0.20 to 0.50 percent

Base saturation: 20 to 50 percent

Reaction: very strongly acid or strongly
acid

pH by NaFI: 8.7 to 10.0

BC Horizon: (C horizon in some pedons)

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 through 6

Texture: very gravelly coarse sandy
loam, very gravelly loamy coarse sand

Clay content: 5 to 15 percent

Rock fragments: 35 to 60 percent

Base saturation: 30 to 60 percent

Reaction: very strongly acid to
moderately acid

Galuche Series

Depth class: Shallow

Drainage class: Somewhat excessively
drained

Parent material: Slope alluvium and
residuum from granitic rocks, gneiss, and
schist

Landform: Mountain slopes

Landform position: Shoulders, backslopes,
and summits

Slope: 20 to 90 percent

Elevation: 7,800 to 9,800 feet

Average annual precipitation: 16 to 22
inches

Average annual air temperature: 42 to 46
degrees F

Frost-free period: 75 to 95 days

Taxonomic class: Loamy-skeletal,
paramicaceous, frigid Lithic Dystrustepts

Typical pedon

Galuche very gravelly sandy loam, in an
area of Galuche-Rock outcrop complex, 20
to 90 percent slopes, about 1.1 miles west of
Moraine Park Campground in Rocky
Mountain National Park; located about 2,300
feet west and 1,000 feet north of the
southeast corner of sec. 31, T 5 N, R 73 W;
USGS Longs Peak topographical
quadrangle; latitude 40 degrees, 21 minutes,
13.5 seconds N; longitude 105 degrees, 37
minutes, 6.5 seconds W, NAD 1927.

Oe—0 inches to 1 inch; moderately
decomposed plant material.

A—1 inch to 3 inches; dark grayish brown
(10YR 4/2) very gravelly sandy loam, very
dark brown (10YR 2/2) moist; moderate fine
granular structure; soft, very friable,
nonsticky and nonplastic; 35 percent gravel
and 15 percent cobbles and 1 percent
stones; neutral (pH 6.8); abrupt wavy
boundary.

E—3 to 9 inches; light brownish gray
(10YR 6/2) very gravelly sandy loam, dark
grayish brown (10YR 4/2) moist; weak fine

subangular blocky structure; soft, very friable, nonsticky and nonplastic; 35 percent gravel and 10 percent cobbles and 1 percent stones; strongly acid (pH 5.4); abrupt wavy boundary.

Bw—9 to 19 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; 35 percent gravel and 10 percent cobbles; very strongly acid (pH 4.6); clear irregular boundary.

R—19 to 60 inches; hard granite and gneiss

Range in Characteristics

(Depths are given from the mineral soil surface)

Soil moisture regime: Ustic

Mean annual soil temperature: 41 to 45 degrees F

Mean summer soil temperature: 57 to 60 degrees F

Depth to lithic contact: 10 to 20 inches

Depth to albic horizon: 0 to 3 inches

Thickness of the cambic horizon: 6 to 10 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent

Sand content: 50 to 75 percent

Rock fragments: 40 to 55 percent, dominantly gravel and cobbles

Mica content: 40 to 70 percent (by grain content)

A Horizon:

Hue: 7.5YR or 10YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 10 to 20 percent

Rock fragments: 35 to 60 percent

Reaction: slightly acid or neutral

E Horizon:

Hue: 7.5YR or 10YR

Value: 5 through 7 dry, 4 through 6 moist

Chroma: 2 or 3

Texture: very gravelly sandy loam, very gravelly coarse sandy loam

Clay content: 8 to 18 percent

Rock fragments: 35 to 60 percent

Reaction: strongly acid or moderately acid

Bw Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 through 6

Texture: very gravelly sandy loam, very gravelly coarse sandy loam

Clay content: 8 to 18 percent

Rock fragments: 35 to 60 percent

Base saturation: 30 to 60 percent

Reaction: very strongly acid to moderately acid

Granile Series

Depth class: Very deep

Drainage class: Well drained

Parent material: Colluvium from granite, gneiss, and schist

Landform: Mountain slopes

Landform position: Backslopes

Slope: 30 to 60 percent

Elevation: 8,000 to 10,000 feet

Average annual precipitation: 20 to 24 inches

Average annual air temperature: 38 to 41 degrees F

Frost-free period: 50 to 70 days

Taxonomic class: Loamy-skeletal, mixed, superactive Ustic Glossocryalfs

Typical pedon

Granile very gravelly coarse sandy loam, in an area of Granile very gravelly coarse sandy loam, 30 to 60 percent slopes, about 0.4 mile north of "The Needles" in the Cow Creek drainage in Rocky Mountain National Park; USGS Estes Park topographic quadrangle; latitude 40 degrees, 2 minutes, 20 seconds N; longitude 105 degrees, 32 minutes, 59 seconds W, NAD 1927.

Oe—0 to 3 inches; moderately decomposed plant material.

E—3 to 8 inches; light gray (10YR 7/2) very gravelly coarse sandy loam (composite texture), dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and common medium and coarse roots; 35 percent gravel and 5

percent cobbles and 10 percent stones; moderately acid (pH 6.0); abrupt wavy boundary.

E/B—8 to 21 inches; 60 percent very pale brown (10YR 7/3) extremely gravelly coarse sandy loam (composite texture), brown (10YR 5/3) moist (E); weak fine subangular blocky structure; hard, friable, nonsticky and nonplastic; common fine and few medium roots; 50 percent gravel and 10 percent cobbles; moderately acid; 40 percent yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/4) moist (B); moderate medium subangular blocky structure; hard, friable, nonsticky and nonplastic; few distinct patchy clay films on faces of peds; 60 percent of the total volume is tongues of albic material; moderately acid (pH 5.8); clear smooth boundary.

Bt—21 to 43 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; few distinct patchy clay films on faces of peds; 40 percent gravel and 15 percent cobbles; moderately acid (pH 6.0); clear wavy boundary.

BC—43 to 65 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; 40 percent gravel and 10 percent cobbles; moderately acid (pH 6.0).

Range in Characteristics

(Depths are given from the mineral soil surface)

Soil moisture regime: Udic bordering on ustic

Thickness of the glossic horizon: 4 to 14 inches

Depth to top of the argillic horizon: 12 to 24 inches

Particle-size control section (weighted average):

Clay content: 20 to 28 percent

Sand content: 45 to 65 percent

Rock fragment content: 35 to 70 percent

Mica content: 15 to 30 percent (by grain count)

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 8 to 18 percent

Reaction: moderately acid or slightly acid

E/B Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 through 6 moist (E)

Value: 5 or 6 dry, 4 or 5 moist (Bt)

Chroma: 2 or 3 (E)

Chroma: 3 through 6 (Bt)

Clay content: 10 to 18 percent

Texture: extremely gravelly coarse sandy loam, extremely gravelly sandy loam

Reaction: moderately acid or slightly acid

Bt Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 through 6

Clay content: 20 to 35 percent

Texture: very gravelly sandy clay loam, very gravelly clay loam

Reaction: moderately acid or slightly acid

BC Horizon:

Hue: 7.5YR or 10YR

Value: 5 through 7 dry, 4 through 6 moist

Chroma: 3 through 6

Clay content: 15 to 27 percent

Texture: very gravelly sandy clay loam, very gravelly sandy loam, very gravelly coarse sandy loam

Reaction: moderately acid or slightly acid

Hiamovi Series

Depth class: Shallow

Drainage class: Somewhat excessively drained

Parent material: Till, slope alluvium, and residuum from granite, gneiss, and schist

Landform: Glaciated mountain slopes

Landform position: Backslopes, shoulders, and summits

Slope: 5 to 65 percent

Elevation: 9,000 to 12,000 feet

Average annual precipitation: 26 to 40 inches

Average annual air temperature: 36 to 42 degrees F

Frost-free period: 10 to 50 days

Taxonomic class: Loamy-skeletal, paramicaceous Lithic Dystocrypts

Typical pedon

Hiamovi extremely gravelly sandy loam, in an area of Fallriver-Hiamovi complex, 10 to 55 percent slopes, about 1.8 miles southwest of Milner Pass in Rocky Mountain National Park; USGS Fall River topographic quadrangle; latitude 40 degrees, 24 minutes, 29 seconds N; longitude 105 degrees, 50 minutes, and 26 seconds W, NAD 1927.

E—0 to 5 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; 55 percent gravel and 10 percent cobbles; strongly acid (pH 5.2); abrupt smooth boundary.

Bw—5 to 13 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; 65 percent gravel, 15 percent cobbles and 5 percent stones; strongly acid (pH 5.2); clear irregular boundary.

R—13 to 60 inches; hard granite and gneiss.

Range in Characteristics

Soil moisture regime: Udic bordering on ustic

Mean annual soil temperature: 36 to 40 degrees F

Mean summer soil temperature: 45 to 48 degrees F

Depth to lithic contact: 10 to 20 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent

Sand content: 45 to 70 percent

Rock fragment content: 60 to 80 percent, dominantly gravel and cobbles
Mica content: 40 to 70 percent (by grain count)

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 8 to 18 percent

Reaction: strongly acid or moderately acid

Bw Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 3 or 4

Texture: extremely gravelly sandy loam, extremely gravelly coarse sandy loam

Clay content: 8 to 18 percent

Reaction: strongly acid or moderately acid

Base saturation: 30 to 60 percent

Isolation Series

Depth class: Very deep

Drainage class: Somewhat excessively drained

Parent material: Till from granite, gneiss, and schist

Landform: Moraines

Landform position: Backslopes, shoulders, and footslopes

Slope: 5 to 35 percent

Elevation: 8,000 to 9,000 feet

Average annual precipitation: 16 to 22 inches

Average annual air temperature: 40 to 44 degrees F

Frost-free period: 70 to 100 days

Taxonomic class: Loamy-skeletal, mixed, superactive frigid Alfic Argiustolls

Typical pedon

Isolation gravelly sandy loam, in an area of Isolation gravelly sandy loam, 5 to 35 percent slopes; about 1,200 feet west and 2,000 feet south of the northeast corner of sec. 32, T 5 N, R 73 W; USGS Longs Peak topographic quadrangle; latitude 40 degrees, 22 minutes, 1 second N; longitude

105 degrees, 35 minutes, 44 seconds W,
NAD 1927.

Oi—0 inches to 1 inch; slightly
decomposed plant material.

A1—1 inch to 6 inches; very dark grayish
brown (10YR 3/2) gravelly sandy loam, very
dark brown (10YR 2/2) moist; moderate
medium granular structure; soft, very friable,
nonsticky and nonplastic; 25 percent gravel,
5 percent cobbles and 2 percent stones;
slightly acid (pH 6.4); abrupt smooth
boundary.

A2—6 to 11 inches; dark grayish brown
(10YR 4/2) very gravelly sandy loam, very
dark grayish brown (10YR 3/2) moist; weak
fine granular structure; soft, very friable,
nonsticky and nonplastic; 30 percent gravel,
10 percent cobbles and 10 percent stones;
neutral (pH 6.6); abrupt wavy boundary.

E and Bt—11 to 24 inches; light gray
(10YR 7/2) extremely cobbly sandy loam,
light brownish gray (10YR 6/2) moist (E);
weak fine subangular blocky structure; soft,
very friable, nonsticky and nonplastic; 40
percent gravel and 30 percent cobbles;
neutral (pH 6.8); lamellae of yellowish brown
(10YR 5/4) extremely cobbly sandy loam,
dark yellowish brown (10YR 4/4) moist (Bt);
abrupt smooth boundary. Total thickness of
lamellae is 1.3 inches.

Bt and E—24 to 33 inches; yellowish
brown (10YR 5/4) extremely gravelly sandy
loam, dark yellowish brown (10YR 4/4) moist
(Bt); moderate medium subangular blocky
structure; slightly hard, very friable, slightly
sticky and slightly plastic; 50 percent gravel
and 15 percent cobbles; neutral (pH 6.6);
pale brown (10YR 6/3) extremely gravelly
sandy loam, brown (10YR 4/3) moist (E);
abrupt smooth boundary. Total thickness of
lamellae 6.25 inches and averages 18
percent clay.

2BC—33 to 39 inches; yellowish brown
(10YR 5/4) extremely gravelly coarse sand,
dark yellowish brown (10YR 4/4) moist;
weak fine subangular blocky structure; soft,
very friable, nonsticky and nonplastic; 65
percent gravel; neutral (pH 7.0); abrupt
smooth boundary.

2C1—39 to 51 inches; light yellowish
brown (10YR 6/4) very gravelly coarse sand,
yellowish brown (10YR 5/4) moist; weak
fine subangular blocky structure; soft, very

friable, nonsticky and nonplastic; 50
percent gravel; neutral (pH 6.8); abrupt
smooth boundary.

3C2—51 to 72 inches; brownish yellow
(10YR 6/6) and yellowish brown (10YR 5/4)
loamy coarse sand, yellowish brown (10YR
5/6) and dark yellowish brown (10YR 4/4)
moist; weak fine subangular blocky
structure; soft, very friable, nonsticky and
nonplastic; 10 percent boulders; neutral (pH
7.0).

Range in Characteristics

(Depths are given from the mineral soil
surface)

Soil moisture regime: Ustic

Mean annual soil temperature: 40 to 44
degrees F

Thickness of the mollic epipedon: 10 to 16
inches

Depth to the base of the argillic horizon: 28
to 50 inches, total thickness of lamellae is 6
to 12 inches

*Depth to lithologic discontinuity with very
coarse and coarse sand:* 28 to 50 inches

*Particle-size control section (weighted
average):*

Clay content: 8 to 18 percent

Sand content: 55 to 75 percent

Rock fragments: 45 to 65 percent,
dominantly gravel and cobbles

Mica content: 15 to 30 percent (by grain
count)

A Horizons:

Hue: 7.5YR or 10YR

Value: 3 through 5 dry, 2 or 3 moist

Chroma: 1 through 3

Clay content: 8 to 18 percent

Texture: gravelly sandy loam, very
gravelly sandy loam

Rock fragments: 15 to 60 percent

Base saturation: 60 to 100 percent

Reaction: slightly acid or neutral

E and Bt Horizons:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist (E part);
5 or 6 dry, 4 or 5 moist (Bt part)

Chroma: 2 through 4 (E part), 3 through
6 (Bt part)

Texture: extremely cobbly sandy loam,
extremely cobbly coarse sandy loam

Clay content: 10 to 20 percent (E & Bt)

Base saturation: 60 to 100 percent
Rock fragments: 35 to 70 percent
Reaction: slightly acid or neutral

Bt and E Horizons:

Hue: 7.5YR or 10YR
Value: 6 or 7 dry, 4 or 5 moist (E part);
 5 or 6 dry, 4 or 5 moist (Bt part)
Chroma: 2 through 4 (E part, 3 through
 6 (Bt part)
Texture: extremely gravelly sandy
 loam, extremely cobbly sandy loam
Clay content: 10 to 20 percent (E & Bt)
Rock fragments: 60 to 80 percent
Base saturation: 60 to 100 percent
Reaction: slightly acid or neutral

2BC Horizon:

Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 4 through 6
Texture: extremely gravelly coarse
 sand, extremely gravelly loamy coarse
 sand
Clay content: 0 to 10 percent
Rock fragments: 60 to 80 percent
Base saturation: 60 to 100 percent
Reaction: slightly acid or neutral

2C1 Horizon:

Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 4 through 6
Texture: very gravelly coarse sand,
 very gravelly sand
Clay content: 0 to 8 percent
Rock fragments: 35 to 70 percent
Base saturation: 60 to 100 percent
Reaction: slightly acid or neutral

3C2 Horizon:

Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 4 through 6
Texture: coarse sand, loamy coarse
 sand
Clay content: 0 to 10 percent
Rock fragments: 0 to 15 percent
Base saturation: 60 to 100 percent
Reaction: slightly acid or neutral

Kawuneeche Series

Depth class: Very deep
Drainage class: Poorly drained

Parent material: Alluvium over glaciofluvial
 deposits from granite, gneiss, and schist
Landform: Flood plains
Slope: 0 to 4 percent
Elevation: 8,000 to 10,700 feet

Average annual precipitation: 18 to
 36 inches
Average annual air temperature: 36 to 42
 degrees F
Frost-free period: 40 to 75 days

Taxonomic class: Coarse-loamy, mixed,
 superactive, nonacid Fluvaquent
 Cryaquepts

Typical pedon

Kawuneeche mucky peat, in an area of
 Kuwuneeche mucky peat, 0 to 4 percent
 slopes, about 2.3 miles northwest of the
 Kawuneeche visitors center in Rocky
 Mountain National Park; located about 1,800
 feet west and 1,400 feet north of the
 southeast corner of sec. 13, T 4 N, R 76 W;
 USGS Grand Lake topographical
 quadrangle; latitude 40 degrees, 18 minutes,
 16 seconds N; longitude 105 degrees, 50
 minutes, 55 seconds W, NAD 1927.

Oe—0 to 5 inches; very dark grayish
 brown (10YR 3/2) mucky peat, very dark
 brown (10YR 2/2) moist; many very fine and
 fine roots and few medium roots; strongly
 acid (pH 5.2); clear smooth boundary.

A—5 to 12 inches; black (10YR 2/1) clay
 loam, black (10YR 2/1) moist; weak fine
 subangular blocky structure; soft, very
 friable, slightly sticky and slightly plastic;
 many very fine and fine roots and few
 medium roots; strongly acid (pH 5.2); abrupt
 smooth boundary.

Bg—12 to 23 inches; gray (10YR 5/1)
 loam, very dark gray (10YR 3/1) moist; weak
 medium subangular blocky structure; slightly
 hard, friable, slightly sticky and slightly
 plastic; common very fine and fine roots;
 common medium irregular dark yellowish
 brown (10YR 3/4) masses of iron
 concentrations on faces of peds; 2 percent
 gravel; strongly acid (pH 4.8); clear smooth
 boundary.

Cg1—23 to 31 inches; grayish brown
 (10YR 5/2) coarse sandy loam, dark grayish

brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; common medium irregular dark yellowish brown (10YR 4/4) masses of iron concentrations on faces of peds; 10 percent gravel; moderately acid (pH 5.6); clear smooth boundary.

2Cg2—31 to 66 inches; grayish brown (10YR 5/2) very gravelly loamy sand, dark greenish gray (10GY 3/1) moist; single grain; loose, nonsticky and nonplastic; few fine roots; 35 percent gravel; slightly acid (pH 6.4).

Range in Characteristics

(Depths given are measured from the mineral soil surface)

Soil moisture regime: Aquic

Mean annual soil temperature: 36 to 40 degrees F

Mean summer soil temperature: 41 to 43 degrees F (with an O horizon)

Depth to lithologic discontinuity: 24 to 43 inches

Depth to redox concentrations: 12 to 24 inches

Depth to redox depletions: 5 to 12 inches

Depth to endosaturation from the organic surface: 0 to 18 inches from June through August

Thickness of the umbric epipedon: 7 to 24 inches

Particle-size control section (weighted average):

Clay content: 5 to 15 percent

Sand content: 50 to 70 percent

Rock fragments: 10 to 25 percent, dominantly gravel

Mica content: 15 to 30 percent (by grain count)

Oe Horizon: (not in all pedons)

Reaction: Very strongly acid or strongly acid

A Horizon:

Hue: 7.5YR or 10YR

Value: 2 through 4 dry, 2 or 3 moist

Chroma: 1 or 2

Texture: loam or clay loam

Clay content: 20 to 35 percent

Rock fragments: 0 to 15 percent gravel

Base saturation: 30 to 50 percent

Reaction: very strongly acid or strongly acid

Bg Horizon:

Hue: 7.5YR or 10YR

Value: 4 through 6 dry, 3 through 5 moist

Chroma: 1 or 2

Texture: loam, silt loam, gravelly sandy loam

Clay content: 8 to 18 percent

Rock fragments: 0 to 25 percent gravel

Base saturation: 30 to 60 percent

Reaction: very strongly acid to moderately acid

Cg1 Horizon:

Hue: 10YR or 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Texture: sandy loam, coarse sandy loam, gravelly sandy loam, gravelly loamy fine sand

Clay content: 5 to 18 percent

Rock fragments: 5 to 30 percent gravel

Base saturation: 40 to 70 percent

Reaction: strongly acid to slightly acid

2Cg2 Horizon:

Hue: 10GY, 5GY, 10YR or neutral

Value: 4 through 6 dry, 3 through 5 moist

Chroma: 0 through 2

Texture: very gravelly loamy sand, very gravelly sand, extremely gravelly coarse sand

Clay content: 1 to 7 percent

Rock fragments: 35 to 75 percent gravel and cobbles

Base saturation: 50 to 70 percent

Reaction: moderately acid or slightly acid

Legault Series

Depth class: Very shallow and shallow

Drainage class: Somewhat excessively drained

Parent material: Slope alluvium over residuum from granite, schist, and gneiss

Landform: Mountain slopes and structural benches

Landform position: Shoulders and backslopes

Slope: 15 to 45 percent

Elevation: 8,500 to 10,000 feet

Average annual precipitation: 18 to 24 inches

Average annual air temperature: 37 to 41 degrees F

Frost-free period: 50 to 75 days

Taxonomic class: Sandy-skeletal, paramicaceous, shallow Typic Cryorthents

Typical pedon

Legault very gravelly sandy loam, in an area of Legault very gravelly sandy loam, 15 to 45 percent slopes, about 0.1 mile north of the Deer Ridge parking area in Rocky Mountain National Park; USGS Estes Park topographic quadrangle; latitude 40 degrees, 23 minutes, 14 seconds N; longitude 105 degrees, 36 minutes, 33 seconds W, NAD 1927.

Oe—0 inches to 1 inch; moderately decomposed plant material.

A—1 inch to 3 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few fine and medium roots; 40 percent gravel; slightly acid (pH 6.5); abrupt wavy boundary.

E—3 to 8 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few medium and coarse roots and common fine; 55 percent gravel and 10 percent cobbles; moderately acid (pH 5.8); clear irregular boundary.

EB—8 to 12 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and medium roots; 65 percent gravel and 10 percent cobbles; moderately acid (pH 6.0); clear irregular boundary.

Cr—12 to 22 inches; soft, partially decomposed granite.

Range in Characteristics

(Depths are given from the mineral soil surface)

Soil moisture regime: Ustic

Mean annual soil temperature: 41 to 45 degrees F

Mean summer soil temperature: 45 to 47 degrees F

Depth to paralithic contact: 5 to 20 inches

Particle-size control section (weighted average):

Clay content: 3 to 8 percent

Sand content: 80 to 90 percent

Rock fragments: 35 to 70 percent

Mica content: 40 to 60 percent (by grain count)

A Horizon: (not present in all pedons)

Hue: 7.5YR or 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 5 to 15 percent

Rock fragments: 35 to 60 percent

Reaction: moderately acid or slightly acid

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 through 4

Clay content: 1 to 5 percent

Texture: extremely gravelly loamy sand, extremely gravelly loamy coarse sand

Rock fragments: 60 to 80 percent

Reaction: moderately acid or slightly acid

EB Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 through 6

Clay content: 1 to 5 percent

Texture: extremely gravelly loamy sand, extremely gravelly loamy coarse sand

Rock fragments: 60 to 80 percent

Reaction: moderately acid or slightly acid

Lumpyridge Series

Depth class: Very deep

Drainage class: Well drained

Parent material: Alluvium from granite, gneiss, and schist

Landform: Fans

Slope: 1 to 15 percent

Elevation: 7,500 to 8,700 feet

Average annual precipitation: 16 to 22 inches

Average annual air temperature: 42 to 46 degrees F

Frost-free period: 70 to 100 days

Taxonomic class: Fine-loamy, paramicaceous, frigid Typic Argiustolls

Typical pedon

Lumpyridge coarse sandy loam, in an area of Lumpyridge-Rofork complex, 3 to 15 percent slopes, about 0.5 mile northeast of Castle Mountain in Rocky Mountain National Park; USGS Estes Park topographical quadrangle; latitude 40 degrees, 23 minutes, 40 seconds N; longitude 105 degrees, 32 minutes, 08 seconds W, NAD 1927.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and common very fine roots; 15 percent gravel; slightly acid (pH 6.4); abrupt smooth boundary.

A2—6 to 11 inches; brown (10YR 4/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and common very fine roots; 15 percent gravel; neutral (pH 6.6); clear wavy boundary.

Bt1—11 to 25 inches; brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; few distinct continuous clay films on faces of peds; 25 percent gravel; neutral (pH 6.8); clear wavy boundary.

Bt2—25 to 39 inches; brown (7.5YR 5/4) gravelly sandy clay loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and few very fine roots; common prominent continuous clay films on faces of peds; 25 percent gravel; neutral (pH 6.8); gradual smooth boundary.

2BC—39 to 45 inches; yellowish brown (10YR 5/4) very gravelly coarse sandy loam,

dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; 37 percent gravel; neutral (pH 6.8); abrupt smooth boundary.

2C—45 to 80 inches; dark yellowish brown (10YR 4/4) very gravelly loamy coarse sand, dark yellowish brown (10YR 3/4) moist; single grain; loose, nonsticky and nonplastic; 40 percent gravel; neutral (pH 7.0).

Range in Characteristics

Soil moisture regime: Ustic

Mean annual soil temperature: 42 to 45 degrees F

Mean summer soil temperature: 60 to 62 degrees F

Depth to argillic horizon: 8 to 15 inches

Depth to the base of the argillic horizon: 25 to 45 inches

Depth to lithologic discontinuity: 25 to 45 inches

Thickness of the mollic epipedon: 8 to 15 inches

Particle-size control section (weighted average):

Clay content: 18 to 27 percent

Sand content: 50 to 65 percent

Rock fragments: 15 to 30 percent, dominantly fine and very fine gravel

Mica content: 40 to 70 percent (by grain count)

A Horizons:

Hue: 7.5YR or 10YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 or 3

Texture: gravelly coarse sandy loam or gravelly sandy loam

Clay content: 8 to 18 percent

Rock fragments: 15 to 25 percent

Reaction: slightly acid or neutral

Bt Horizons:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 through 6

Texture: gravelly sandy loam, gravelly sandy clay loam

Clay content: 18 to 30 percent

Rock fragments: 15 to 35 percent

Reaction: slightly acid or neutral

2BC Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist
Chroma: 4 through 6
Texture: very gravelly coarse sandy loam, very gravelly loamy coarse sand
Clay content: 3 to 10 percent percent
Rock fragments: 35 to 60 percent
Reaction: slightly acid or neutral

2C Horizon:

Hue: 7.5YR or 10YR
Value: 4 through 6 dry, 3 through 5 moist
Chroma: 4 through 6
Texture: very gravelly loamy coarse sand, very gravelly coarse sand
Clay content: 0 to 7 percent
Rock fragments: 35 to 60 percent
Reaction: slightly acid or neutral

Mummy Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Parent material: Colluvium and till from granite, gneiss, and schist
Landform: Mountains
Landform position: Footslopes and backslopes
Slope: 10 to 60 percent
Elevation: 10,400 to 12,200 feet
Average annual precipitation: 30 to 40 inches
Average annual air temperature: 34 to 38 degrees F
Frost-free period: 10 to 30 days

Taxonomic class: Loamy-skeletal, paramicaceous Humic Dystricrypts

Typical pedon

Mummy extremely cobbly sandy loam, in an area of Mummy extremely cobbly sandy loam, 20 to 50 percent slopes, about 1.8 miles southeast of Fall River Pass in Rocky Mountain National Park; USGS Trail Ridge topographic quadrangle; latitude 40 degrees, 24 minutes, 24 seconds N; longitude 105 degrees, 42 minutes, 04 seconds W, NAD 1927.

A—0 to 5 inches; dark grayish brown (10YR 4/2) extremely cobbly sandy loam, very dark brown (10YR 2/2) moist; weak fine

granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine and common medium roots; 15 percent gravel and 30 percent cobbles and 20 percent stones; very strongly acid (pH 4.8); abrupt wavy boundary.

Bw1—5 to 24 inches; brown (10YR 5/3) extremely cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine and few medium roots; 15 percent gravel, 30 percent cobbles and 20 percent stones; strongly acid (pH 5.4); clear smooth boundary.

Bw2—24 to 72 inches; yellowish brown (10YR 5/4) extremely cobbly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 20 percent gravel and 30 percent cobbles and 10 percent stones; strongly acid (pH 5.2).

Range in Characteristics

Soil moisture regime: Udic
Mean annual soil temperature: 32 to 36 degrees F
Mean summer soil temperature: 43 to 47 degrees F
Thickness of the umbric horizon: 10 to 30 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent
Sand content: 45 to 75 percent
Rock fragments: 45 to 65 percent,
Mica content: 40 to 70 percent (by grain count)

A Horizon:

Hue: 7.5YR or 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 2 or 3
Texture: gravelly sandy loam, extremely cobbly sandy loam
Clay content: 10 to 18 percent
Rock fragments: 15 to 75 percent, dominantly gravel and cobbles
Base saturation: 10 to 40 percent

Reaction: very strongly acid or strongly acid

Bw1 Horizon:

Hue: 7.5 YR or 10YR

Value: 4 to 6 dry, 2 to 4 moist

Chroma: 2 or 3

Texture: extremely cobbly sandy loam, very gravelly sandy loam, very gravelly loam

Clay content: 10 to 20 percent

Rock fragments: 35 to 75 percent, dominantly gravel and cobbles

Base saturation: 10 to 50 percent

Reaction: very strongly acid or strongly acid

Bw2 Horizon:

Hue: 7.5YR to 10YR

Value: 5 to 7 dry, 3 to 5 moist

Chroma: 3 to 6

Texture: extremely cobbly coarse sandy loam, extremely cobbly sandy loam, very gravelly loam, very cobbly sandy loam, very gravelly sandy loam, very gravelly coarse sandy loam. Some pedons have a texture (fine earth fraction) of loamy coarse sand below a depth of 40 inches.

Clay content: 8 to 18 percent

Rock fragments: 35 to 75 percent, dominantly gravel and cobbles

Base saturation: 40 to 60 percent

Reaction: very strongly acid to moderately acid

Nanita Series

Depth class: Very deep

Drainage class: Somewhat excessively drained

Parent material: Till and colluvium from granite, gneiss, and schist

Landform: Moraines and glaciated mountain slopes

Landform position: Shoulders, backslopes, and summits

Slope: 1 to 60 percent

Elevation: 8,200 to 10,000 feet

Average annual precipitation: 16 to 24 inches

Average annual air temperature: 36 to 42 degrees F

Frost-free period: 40 to 70 days

Taxonomic class: Sandy-skeletal, mixed, Lamellic Cryorthents

Typical pedon

Nanita very gravelly sandy loam, in an area of Nanita very gravelly sandy loam, 10 to 60 percent slopes; about 800 feet south and 1,700 feet east of the northwest corner of sec. 5, T 4 N, R 73 W; USGS Longs Peak topographic quadrangle; latitude 40 degrees, 20 minutes, 55 seconds N; longitude 105 degrees, 35 minutes, 41 seconds W, NAD 1927.

Oe—0 inches to 1 inch; moderately decomposed plant material.

E1—1 inch to 10 inches; light gray (10YR 7/2) very gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common medium roots; 30 percent gravel and 10 percent cobbles; neutral (pH 6.6); abrupt smooth boundary.

E2—10 to 23 inches; very pale brown (10YR 7/3) extremely gravelly loamy sand, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine to medium roots; 40 percent gravel and 20 percent cobbles; neutral (pH 6.8); abrupt smooth boundary.

E and Bt1—23 to 41 inches; 85 percent light gray (10YR 7/2) extremely gravelly sand, brown (10YR 4/3) moist (E); 15 percent lamellae of brown (10YR 5/3) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist (Bt); weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; lamellae are discontinuous horizontal to diagonal, .2 to 1 cm thick with total thickness of 4 cm; 40 percent gravel and 20 percent cobbles; slightly acid (pH 6.4); gradual smooth boundary.

E and Bt2—41 to 71 inches; light gray (10YR 7/2) extremely gravelly sand, grayish brown (10YR 5/2) moist (E); lamellae of yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist (Bt); weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very

fine roots; lamellae are discontinuous horizontal to diagonal, .2 to 1 cm thick with total thickness of 5.5 cm; 35 percent gravel and 15 percent cobbles and 10 percent stones; neutral (pH 6.6).

Range in Characteristics

(Depths are given from the mineral soil surface)

Soil moisture regime: Ustic

Mean annual soil temperature: 36 to 40 degrees F

Mean summer soil temperature: 40 to 45 degrees F

Depth to lamellae: 10 to 24 inches

Thickness of lamellae: .2 to 1 cm, total thickness of 5 to 12 cm

Clay content in lamellae: 5 to 18 percent

Particle-size control section (weighted average):

Clay content: 1 to 8 percent

Sand content: 75 to 90 percent

Rock fragments: 45 to 70 percent

Mica content: 15 to 30 percent (by grain count)

An A horizon is present in some pedons.

E1 Horizon:

Hue: 7.5YR or 10YR

Value: 6 to 8 dry, 4 to 6 moist

Chroma: 1 to 3

Texture: very gravelly sandy loam, very gravelly loamy sand, extremely gravelly loamy coarse sand

Clay content: 5 to 18 percent

Rock fragments: 35 to 80 percent

Reaction: strongly acid to neutral

E2 Horizon:

Hue: 7.5YR or 10YR

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 2 to 3

Texture: extremely gravelly loamy sand, very gravelly sand

Clay content: 0 to 8 percent

Rock fragments: 35 to 80 percent

Reaction: moderately acid to neutral

E and Bt Horizons:

Hue: 7.5YR or 10YR

Value: 5 to 7 dry, 4 to 6 moist (E)

Value: 5 or 6 dry, 4 or 5 moist (Bt)

Chroma: 2 or 3 (E), 3 to 6 (Bt)

Texture: extremely gravelly sand, extremely gravelly loamy sand,

extremely cobbly loamy sand, extremely cobbly loamy coarse sand (E)

Texture: extremely gravelly sandy

loam, extremely cobbly sandy loam (Bt)

Clay content: 0 to 5 percent (E), 5 to 18 percent (Bt)

Rock fragments: 35 to 80 percent

Reaction: moderately acid to neutral

BC Horizon: (Present in some pedons)

Hue: 7.5YR or 10YR

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 3 to 6

Texture: extremely gravelly sand, extremely cobbly loamy coarse sand, extremely cobbly sand

Clay content: 2 to 8 percent

Reaction: moderately acid to neutral

Onahu Series

Depth class: Deep

Drainage class: Poorly drained

Parent material: Alluvium over till from granite, gneiss, and schist

Landform: Glaciated mountains slopes and cirques

Landform position: Toeslopes, backslopes, and footslopes

Slope: 2 to 25 percent

Elevation: 11,000 to 12,500

Average annual precipitation: 30 to 40 inches

Average annual air temperature: 32 to 38 degrees F

Frost-free period: 10 to 30 days

Taxonomic class: Loamy-skeletal, paramicaceous, acid Aeric Humic Cryaquepts

Typical pedon

Onahu loam, in an area of Onahu-Terric Cryofibrists-Trailridge complex, 2 to 35 percent slopes About 1.9 miles south of the Gore Range Overlook in Rocky Mountain National Park; USGS Fall River topographic quadrangle; latitude 40 degrees, 24 minutes, 24 seconds N; longitude 105 degrees, 46 minutes, 31 seconds W, NAD 1927.

A1—0 to 7 inches; brown (7.5YR 4/2) loam, very dark brown (7.5YR 2/2) moist; weak fine granular structure; soft, very

friable, slightly sticky and slightly plastic; many very fine and fine roots; very strongly acid (pH 4.5); clear smooth boundary.

A2—7 to 16 inches; brown (7.5YR 4/3) loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; 10 percent gravel; very strongly acid (pH 4.5); abrupt smooth boundary.

Bg—16 to 24 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common medium dark yellowish brown (10YR 4/6) masses of iron concentrations throughout and common medium light gray (10YR 7/1) iron depletions throughout; 40 percent gravel; very strongly acid (pH 4.6); clear smooth boundary.

Cg—24 to 45 inches; dark gray (10YR 4/1) very gravelly sandy loam, light gray (10YR 7/1) dry; massive; soft, very friable, slightly sticky and slightly plastic; common fine dark yellowish brown (10YR 4/6) masses of iron concentrations throughout; 50 percent gravel and 5 percent cobbles; very strongly acid (pH 4.6).

3Cr—45 to 55 inches; soft weathered gneiss and schist.

Range in Characteristics

Soil moisture regime: Aquic

Mean annual soil temperature: 33 to 35 degrees F

Mean summer soil temperature: 36 to 40 degrees F

Thickness of the umbric epipedon: 12 to 24 inches

Depth to episaturation: 6 to 18 inches

Depth to redox concentrations: 7 to 18 inches

Depth to redox depletions: 15 to 24 inches

Depth to paralithic contact: 40 to 60 inches

Base saturation: 15 to 45 percent

Particle-size control section (weighted average):

Clay content: 8 to 18 percent

Sand content: 45 to 60 percent

Rock fragments: 35 to 45 percent, dominantly gravel and cobble

Mica content: 35 to 60 percent (by grain count)

A1 Horizon:

Hue: 7.5YR or 10YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 1 to 3

Clay content: 10 to 18 percent

Texture: loam, sandy loam, fine sandy loam

Rock fragments: 0 to 15 percent

Base saturation: 15 to 35 percent

Reaction: very strongly acid or strongly acid

A2 Horizon:

Hue: 7.5YR or 10YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 1 to 3

Clay content: 10 to 18 percent

Texture: loam, fine sandy loam or sandy loam

Rock fragments: 0 to 25 percent

Base saturation: 15 to 45 percent

Reaction: very strongly acid or strongly acid

2Bg Horizon:

Hue: 7.5YR or 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 1 or 2

Clay content: 10 to 18 percent

Texture: very gravelly sandy loam, very gravelly fine sandy loam

Rock fragments: 35 to 60 percent

Base saturation: 25 to 45 percent

Reaction: very strongly acid or strongly acid

2Cg Horizon:

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 1 or 2

Clay content: 8 to 18 percent

Texture: very gravelly sandy loam, very gravelly coarse sandy loam

Base saturation: 25 to 45 percent

Reaction: very strongly acid or strongly acid

Peeler Series

Depth class: Very deep

Drainage class: Well drained

Parent material: Till from granite, gneiss, and schist

Landform: Moraines and glaciated

mountain slopes

Landform position: Backslopes and footslopes

Slope: 5 to 40 percent

Elevation: 8,000 to 9,000 feet

Average annual precipitation: 22 to 26 inches

Average annual air temperature: 36 to 42 degrees F

Frost-free period: 30 to 70 days

Taxonomic class: Fine-loamy, mixed, superactive, Ustic Glossocryalfs

Typical pedon

Peeler loam, in an area of Peeler loam, 5 to 40 percent slopes, about 1,850 feet north and 1,600 feet west of the southeast corner of sec. 19, T 3 N, R 75 W; USGS Shadow Mountain topographic quadrangle; latitude 40 degrees, 12 minutes, 12 seconds N; longitude 105 degrees, 49 minutes, 54 seconds W, NAD 1927.

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 10 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium and coarse roots; 22.0 percent clay; moderately acid (pH 5.9); clear smooth boundary

B/E—10 to 22 inches; 80 percent brown (7.5YR 5/4) sandy clay loam, brown (7.5YR 4/4) moist (Bt), and 20 percent very pale brown (10YR 7/3) sandy clay loam, brown (10YR 4/3) (E) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine and few medium and coarse roots; 20 percent of the total volume is tongues of albic material; few distinct patchy clay films on faces of peds and in pores; 10 percent gravel; slightly acid (pH 6.2); gradual wavy boundary

Bt—22 to 40 inches; brown (7.5YR 5/4) sandy clay loam, brown (7.5YR 4/4) moist; strong medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine and fine and few medium and coarse roots; 5 percent of the total area is tongues of albic material; few prominent

continuous clay films on faces of peds and few distinct patchy pale brown (10YR 6/3) skeletons on faces of peds and in pores; 10 percent gravel; neutral (pH 6.7); clear wavy boundary

BC—40 to 62 inches; light brown (7.5YR 6/4) gravelly sandy clay loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine to coarse roots; 22 percent gravel; neutral (pH 6.7).

Range in Characteristics

(Depths are given from the mineral soil surface)

Thickness of the albic horizon: 4 to 12 inches

Depth to base of the argillic horizon: 30 to 60 inches

Particle-size control section (weighted average):

Clay content: 18 to 27 percent

Sand content: 45 to 65 percent

Rock fragment content: 5 to 20 percent

Mica content: 15 to 30 percent (by grain count)

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 through 8 dry, 4 through 6 moist

Chroma: 1 to 3

Clay content: 15 to 25 percent

Reaction: strongly acid to slightly acid

B/E Horizon:

Hue: 7.5YR or 10YR

Value: 6 through 8 dry, 4 through 6 moist (E)

Value: 5 or 6 dry, 4 or 5 moist (Bt)

Chroma: 1 to 3 (E), 3 to 6 (Bt)

Clay content: 20 to 35 percent

Texture: sandy clay loam, loam

Reaction: moderately acid to neutral

Bt Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 to 6

Clay content: 20 to 35 percent

Texture: sandy clay loam, clay loam

Reaction: moderately acid to neutral

BC Horizon:

Hue: 7.5YR or 10YR

Value: 5 through 7 dry, 4 through 6 moist

Chroma: 3 to 6

Clay content: 20 to 27 percent

Texture: gravelly sandy loam, gravelly sandy clay loam

Reaction: slightly acid or neutral

The Peeler soils in this survey area are taxadjuncts because they have an udic moisture regime that does not border ustic. This difference, however, does not significantly affect the use, management, or interpretations of the soils. In this survey the Peeler soils are fine-loamy, mixed, superactive, Typic Glossocryalfs.

Rofork Series

Depth class: Shallow

Drainage class: Somewhat excessively drained

Parent material: Slope alluvium and residuum from granite, schist, and gneiss

Landform: Mountain slopes and structural benches

Landform position: Summits, shoulders, and backslopes

Slope: 5 to 35 percent

Elevation: 7,500 to 9,000 feet

Average annual precipitation: 16 to 22 inches

Average annual air temperature: 40 to 44 degrees F

Frost-free period: 70 to 100 days

Taxonomic class: Loamy-skeletal, paramicaceous, frigid, shallow Entic Haplustolls

Typical pedon

Rofork very gravelly sandy loam, in an area of Rofork-Chasmfalls complex, 5 to 35 percent slopes, about 2,000 feet south and 150 feet east of the northwest corner of sec. 29, T 5 N, R 73 W; USGS Longs Peak topographic quadrangle; latitude 40 degrees, 22 minutes, 28 seconds N; longitude 105 degrees, 36 minutes, 24 seconds W, NAD 1927.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) very gravelly sandy loam, black (10YR 2/1) moist; moderate medium

granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 40 percent gravel; neutral (pH 6.8); abrupt smooth boundary.

Bw—5 to 10 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky and weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 40 percent gravel; neutral (pH 6.8); abrupt wavy boundary.

C—10 to 14 inches; brown (10YR 5/3) extremely gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; 70 percent gravel; neutral (pH 7.0).

Cr—14 to 24 inches; soft to moderately hard, partially decomposed granite.

Range in Characteristics

Soil moisture regime: Ustic

Mean annual soil temperature: 41 to 45 degrees F

Mean summer soil temperature: 59 to 63 degrees F

Thickness of the mollic epipedon: 7 to 16 inches

Depth to paralithic contact: 10 to 20 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent

Sand content: 55 to 75 percent

Rock fragments: 40 to 60 percent, dominantly gravel

Mica content: 40 to 70 percent (by grain count)

A Horizon:

Hue: 7.5YR or 10YR

Value: 3 to 5 dry, 2 or 3 moist

Chroma: 1 to 3

Clay content: 12 to 18 percent

Rock fragments: 35 to 60 percent, dominantly gravel

Reaction: slightly acid or neutral

Bw Horizon:

Hue: 7.5YR or 10YR

Value: 3 to 6 dry, 2 to 4 moist

Chroma: 2 to 4

Clay content: 12 to 18 percent

Texture: very gravelly sandy loam or

very gravelly coarse sandy loam
Rock fragments: 35 to 60 percent,
 dominantly gravel

Reaction: slightly acid or neutral

C Horizon (not in all pedons):

Hue: 7.5YR or 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4

Clay content: 5 to 10 percent

Texture: extremely gravelly coarse
 sandy loam or extremely gravelly loamy
 coarse sand

Rock fragments: 60 to 75 percent,
 dominantly gravel

Reaction: slightly acid or neutral

Terric Cryofibrists

Depth class: Very deep

Drainage class: Very poorly drained

Parent material: Herbaceous organic
 material over alluvium and till derived from
 granite, gneiss, and schist

Landform: Flood plains and cirques

Elevation: 8,200 to 12,200 feet

Slope: 0 to 7 percent

Average annual precipitation: 24 to 40
 inches

Average annual air temperature: 32 to 38
 degrees F

Frost-free period: 10 to 60 days

Taxonomic class: Terric Cryofibrists

Typical pedon

Reference pedon was from an area of Terric
 Cryofibrists, 0 to 2 percent slopes;
 Horseshoe Park near Endovalley picnic area
 in Rocky Mountain National park; USGS
 Trailridge topographical quadrangle; latitude
 40 degrees, 24 minutes, 38 seconds N;
 longitude 105 degrees, 38 minutes, 38
 seconds W, NAD 1927.

Oi—0 to 19 inches; dark grayish brown
 (10YR 4/2) peat, very dark grayish brown
 (10YR 3/2) moist; about 80 percent fibers
 rubbed; very strongly acid (pH 4.8); abrupt
 smooth boundary.

Oa—19 to 21 inches; very dark gray (10YR
 3/1) muck, black (10YR 2/1) moist; about 5
 percent fibers rubbed; very strongly acid (pH
 4.6); abrupt smooth boundary.

Ag—21 to 32 inches; dark gray (10YR 4/1)
 loam, very dark gray (10YR 3/1) moist; weak
 fine subangular blocky structure; slightly
 hard, very friable, slightly sticky and slightly
 plastic; many fine to medium roots; few fine
 distinct strong brown (7.5YR 5/6) masses of
 iron accumulation on faces of peds; strongly
 acid (pH 5.1); clear smooth boundary.

Cg1—32 to 53 inches; dark gray (7.5YR
 4/1) stratified loamy sand, sandy loam, and
 loam, very dark gray (7.5YR 3/1) moist;
 massive; soft, very friable, nonsticky and
 nonplastic; common very fine and fine roots;
 common medium distinct strong brown
 (7.5YR 5/6) masses of iron accumulation on
 faces of peds; moderately acid (pH 5.2);
 clear smooth boundary.

Cg2—53 to 60 inches; very dark gray
 (7.5YR 3/1) very gravelly sandy loam, black
 (7.5YR 2.5/1) moist; massive; soft, very
 friable, slightly sticky and slightly plastic; few
 fine and fine roots; common medium distinct
 strong brown (7.5YR 5/6) masses of iron
 accumulation on faces of peds; 40 percent
 gravel; strongly acid (pH 5.1).

Range in Characteristics

Soil moisture regime: Aquic

Mean annual soil temperature: 32 to 36
 degrees F

Mean summer soil temperature: 34 to 38
 degrees F

Thickness of organic soil materials: 16 to 40
 inches

*Particle-size control section (weighted
 average):*

Rock fragment content: 0 to 50 percent

Mica content: 20 to 50 percent (by grain
 count)

O Horizons:

Hue: 7.5YR or 10YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 1 or 2

Texture: peat, mucky peat, muck

Rock fragments: 0 to 25 percent

Reaction: very strongly acid or strongly
 acid

Ag Horizon:

Hue: 7.5YR or 10YR

Value: 3 through 5 dry, 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 25 percent
Texture: loam, fine sandy loam
Rock fragments: 0 to 25 percent
Reaction: very strongly acid or strongly acid

Cg1 Horizon:

Hue: 7.5YR or 10YR
Value: 4 through 6 dry, 3 or 4 moist
Chroma: 1 or 2
 Clay content: 5 to 20 percent
Texture: stratified loam, sandy loam, loamy sand
Rock fragments: 0 to 25 percent
Reaction: very strongly acid or strongly acid

Cg2 Horizon:

Hue: 7.5YR or 10YR
Value: 4 through 6 dry, 3 or 4 moist
Chroma: 1 or 2
 Clay content: 1 to 15 percent
Texture: very gravelly sandy loam, very gravelly loamy sand
Rock fragments: 35 to 60 percent
Reaction: very strongly acid to moderately acid

Terric Cryofibrists vary from loamy to loamy-skeletal, dysic to euic, and mixed to paramicaceous families. Terric Cryofibrists cannot be classified at the series level because of the variabilities at the family level.

Tileston Series

Depth class: Very deep
Drainage class: Well drained
Parent material: Colluvium and till from granitic rocks, gneiss, and schist
Landform: Glaciated mountain slopes and moraines
Landform position: Backslopes
Elevation: 9,000 to 10,500 feet
Slope: 10 to 40 percent
Average annual precipitation: 24 to 40 inches
Average annual air temperature: 36 to 42 degrees F
Frost-free period: 30 to 70 days

Taxonomic class: Loamy-skeletal, isotic Typic Glossocryalfs

Typical pedon

Tileston very cobbly sandy loam, in an area of Tileston very cobbly sandy loam, 10 to 40 percent slopes, about 0.5 mile east of Finch Lake in Wild Basin of Rocky Mountain National Park; located about 600 feet west and 1,600 feet south of the northeast corner of sec. 32, T 3 N, R 73 W; USGS Allens Park topographical quadrangle; latitude 40 degrees, 11 minutes, 03 seconds N; longitude 105 degrees, 34 minutes, 57 seconds W, NAD 1927.

Oe—0 to 3 inches; moderately decomposed plant material

E—3 to 7 inches; light gray (10YR 7/2) very cobbly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky and moderate medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; 20 percent gravel and 20 percent cobbles and 15 percent stones; very strongly acid (pH 4.8); clear wavy boundary.

E/B—7 to 13 inches; 80 percent light gray (10YR 7/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist (E); weak fine subangular blocky and moderate medium granular structure; 20 percent yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist (Bt); weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium and coarse roots; 25 percent gravel and 10 percent cobbles and 5 percent stones; 80 percent of the total volume is tongues of albic material; very strongly acid (pH 4.6); clear wavy boundary.

B/E—13 to 28 inches; 75 percent brown (7.5YR 5/4) extremely cobbly sandy clay loam, brown (7.5YR 4/4) moist (Bt); moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine to coarse roots; common distinct patchy clay films on faces of peds and few distinct patchy clay bridging on faces of peds and in pores; 25 percent pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3) moist (E); 25 percent gravel and 40 percent

cobbles and 10 percent stones; very strongly acid (pH 4.6); clear wavy boundary.

Bt—28 to 36 inches; brown (7.5YR 5/4) extremely cobbly sandy clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; few fine and medium roots; common distinct continuous clay films on faces of peds; 25 percent gravel and 30 percent cobbles and 20 percent stones; very strongly acid (pH 4.6); clear smooth boundary.

BC—36 to 64 inches; reddish yellow (7.5YR 6/6) extremely cobbly sandy loam, strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; 25 percent gravel and 25 percent cobbles and 15 percent stones; very strongly acid (pH 4.6).

Range in Characteristics

(Depths given are from the mineral soil surface)

Soil moisture regime: Udic

Mean annual soil temperature: 36 to 40 degrees F

Mean summer soil temperature: 40 to 44 degrees F

Depth to albic horizon: 0 to 4 inches

Depth to glossic horizon: 3 to 11 inches

Depth to the base of the argillic horizon: 24 to 50 inches

Base saturation: 30 to 50 percent

Particle-size control section (weighted average):

Clay content: 18 to 27 percent

Sand content: 55 to 70 percent

Rock fragments: 50 to 75 percent

Mica content: 15 to 30 percent mica (by grain count)

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 8 to 18 percent

Rock fragments: 35 to 60 percent

E/B Horizon:

Hue: 7.5YR or 10YR

Value: (E) 6 or 7 dry, 4 or 5 moist

Value: (B) 5 or 6 dry, 4 or 5 moist

Chroma: (E) 2 or 3

Chroma: (B) 4 through 6

Texture: very gravelly sandy loam, very gravelly sandy clay loam

Clay content: 10 to 25 percent

Rock fragments: 35 to 60 percent

Reaction: very strongly acid or strongly acid

B/E Horizon:

Hue: 7.5YR or 10YR

Value: (Bt) 5 or 6 dry, 4 or 5 moist

Value: (E) 6 or 7 dry, 4 through 6 moist

Chroma: (Bt) 4 through 6

Chroma: (E) 2 or 3

Texture: extremely cobbly sandy clay loam, extremely cobbly sandy loam

Clay content: (Bt) 20 to 30 percent

Clay content: (E) 10 to 20 percent

Rock fragments: 35 to 75 percent

Reaction: very strongly acid or strongly acid

Bt Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 4 through 6

Texture: extremely cobbly sandy clay loam, extremely cobbly sandy loam

Clay content: 18 to 30 percent

Rock fragments: 60 to 75 percent

Reaction: very strongly acid or strongly acid

BC Horizon:

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 4 through 6

Texture: extremely cobbly sandy loam, extremely cobbly coarse sandy loam, extremely cobbly loamy coarse sand

Clay content: 5 to 15 percent

Rock fragments: 60 to 75 percent

Reaction: very strongly acid or strongly acid

Tonahutu Series

Depth class: Very deep

Drainage class: Well drained

Landform: Moraines

Landform position: Backslopes

Parent material: Gravelly till derived from granite, gneiss, and schist

Elevation: 8,700 to 11,000 feet

Slope: 15 to 50 percent

Average annual precipitation: 24 to 34 inches

Average annual temperature: 38 to 42 degrees F

Frost-free period: 30 to 70 days

Taxonomic class: Loamy-skeletal, mixed, superactive Lamellic Haplocryalfs

Typical pedon

Tonahutu very gravelly sandy loam, in an area of Tonahutu very gravelly sandy loam, 15 to 30 percent slopes, about 1.1 miles northeast of Kawaneeche visitors center in Rocky Mountain National Park, about 2,100 feet north and 800 feet east of the southwest corner of sec. 29, T 4 N, R 75 W; USGS Grand Lake topographic quadrangle; latitude 40 degrees, 16 minutes, 39 seconds N; longitude 105 degrees, 49 minutes, 18 seconds W, NAD 1927.

Oe—0 inches to 1 inch; moderately mostly decomposed moss and needles.

E—1 inch to 6 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic, many medium and coarse roots, common very fine and fine roots; 25 percent gravel and 11 percent cobble; strongly acid (pH 5.2); abrupt smooth boundary.

E and Bt1—6 to 21 inches; 65 percent pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; and 35 percent lamellae of light yellowish brown (10YR 6/4), very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots, few medium and coarse; few distinct discontinuous clay bridging between sand grains and in root channels and pores; total thickness of lamellae is 1 inch; 40 percent gravel; moderately acid (pH 5.6); clear wavy boundary.

E and Bt2—21 to 35 inches; 55 percent pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; and 45 percent lamellae of light yellowish brown (10YR 6/4), very gravelly sandy clay loam, dark yellowish brown (10YR 5/4) moist; slightly hard, friable, slightly sticky and slightly plastic; few fine and coarse roots;

common distinct discontinuous clay bridging between sand grains and in root channels and pores; total thickness of lamellae is 3 inches; 40 percent gravel; moderately acid (pH 6.0); clear wavy boundary.

Bt and E—35 to 45 inches; 70 percent lamellae of strong brown (7.5YR 5/6) very gravelly sandy clay loam, strong brown (7.5YR 4/6) moist; 25 percent pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; few very fine to coarse roots; common distinct discontinuous clay bridging between sand grains and in root channels and pores; total thickness of lamellae is 2.5 inches; 45 percent gravel and 5 percent cobbles; slightly acid (pH 6.2); clear wavy boundary.

BC—45 to 62 inches; light brownish gray (10YR 6/2) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; soft; very friable, nonsticky and nonplastic; few fine to coarse roots; 45 percent gravel and 10 percent cobbles; slightly acid (pH 6.4).

Range in Characteristics

(Depths are given from the mineral soil surface)

Soil moisture regime: Udic

Average annual soil temperature: 36 to 40 degrees F

Average summer soil temperature: 43 to 47 degrees F

Depth to lamellae: 6 to 24 inches

Thickness of the lamellae (total): 6 to 20 inches

Base saturation: 60 to 85 percent

Particle-size control section (weighted average):

Clay content: 10 to 18 percent

Sand content: 55 to 80 percent

Rock fragment content: 35 to 50 percent

Mica content: 15 to 30 percent (by grain count)

E Horizon:

Hue: 7.5YR or 10YR

Value: 6 to 8 dry, 4 to 6 moist

Chroma: 2 or 3

Clay content: 10 to 18 percent

Rock fragments: 35 to 60 percent

Reaction: strongly acid or

moderately acid

E and Bt Horizons:

Hue: 7.5YR or 10YR

Value: (E) 6 or 7 dry, 4 to 6 moist

Value: (Bt) 5 or 6 dry, 4 or 5 moist

Chroma: (E) 2 or 3

Chroma: (Bt) 3 to 6

Texture: (E) very gravelly sandy loam,

very gravelly coarse sandy loam

Texture: (Bt) very gravelly sandy loam,

very gravelly sandy clay loam

Clay content: 5 to 18 percent (E), 15 to 27 percent (Bt)

Rock fragments: 35 to 60 percent

Base saturation: 60 to 85 percent

Reaction: strongly acid to slightly acid

Bt and E Horizons:

Hue: 7.5YR or 10YR

Value: (Bt) 5 or 6 dry, 4 or 5 moist

Value: (E) 6 or 7 dry, 4 to 6 moist

Chroma: (Bt) 3 to 6

Chroma: (E) 2 or 3

Texture: (Bt) very gravelly sandy loam,

very gravelly sandy clay loam

Texture: (E) very gravelly sandy loam,

very gravelly coarse sandy loam

Clay content: 15 to 27 percent (Bt), 5 to 18 percent (E)

Rock fragments: 35 to 60 percent

Base saturation: 60 to 85 percent

Reaction: moderately acid or slightly acid

BC Horizons:

Hue: 7.5YR or 10YR

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 2 to 6

Texture: very gravelly sandy loam, very gravelly loamy sand

Clay content: 5 to 15 percent

Rock fragments: 35 to 60 percent

Reaction: moderately acid to neutral

Trailridge Series

Depth class: Shallow

Drainage class: Somewhat excessively drained

Parent material: Slope alluvium and residuum from granite, gneiss, and schist

Landform: Mountain

Landform position: Summits and shoulders

Slope: 10 to 60 percent

Elevation: 10,400 to 12,500 feet

Average annual precipitation: 30 to 40 inches

Average annual air temperature: 34 to 38 degrees F

Frost-free period: 10 to 30 days

Taxonomic class: Loamy-skeletal, paramicaceous, shallow Humic Dystrocrypts

Typical pedon

Trailridge extremely gravelly sandy loam, in an area of Trailridge-Mummy complex, 20 to 60 percent slopes, about 1 mile east of Fall River Pass in Rocky Mountain National Park; USGS Trail Ridge topographic quadrangle; latitude 40 degrees, 26 minutes, 40 seconds N; longitude 105 degrees, 44 minutes, 14 seconds W, NAD 1927.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) extremely gravelly sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; 55 percent gravel and 10 percent cobbles; very strongly acid (pH 5.0); abrupt smooth boundary.

A2—6 to 11 inches; very dark grayish brown (10YR 3/2) extremely gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; 55 percent gravel and 10 percent cobbles; very strongly acid (pH 4.8); abrupt smooth boundary.

Bw—11 to 19 inches; yellowish brown (10YR 5/4) extremely gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; 60 percent gravel and 15 percent cobbles; very strongly acid (pH 4.8); clear smooth boundary.

Cr—19 to 29 inches; weathered schist.

Range in Characteristics

Soil moisture regime: Udic

Mean annual soil temperature: 32 to 36 degrees F

Mean summer soil temperature: 43 to 47 degrees F

Thickness of the umbric epipedon: 7 to

20 inches

Depth to paralithic contact: 10 to 20 inches

Base saturation: 30 to 50 percent

Particle-size control section (weighted average):

Clay content: 8 to 18 percent

Sand content: 45 to 70 percent

Mica content: 40 to 70 percent (by grain count)

A Horizon:

Hue: 7.5YR or 10YR

Value: 3 to 5 dry, 2 or 3 moist

Chroma: 1 to 3

Clay content: 8 to 18 percent

Rock fragment content: 60 to 70 percent

Reaction: very strongly acid or strongly acid

Bw Horizon:

Hue: 7.5YR or 10YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 to 6

Texture: extremely gravelly sandy loam, extremely gravelly coarse sandy loam

Clay content: 8 to 18 percent

Rock fragment content: 60 to 80 percent

Reaction: very strongly acid to moderately acid

Venable Series

Depth class: Very deep

Drainage class: Poorly drained

Parent material: Alluvium from granite, gneiss, and schist

Landform: Flood plains

Seasonal high water table: 6 to 20 inches

Slope: 0 to 1 percent

Elevation: 8,200 to 9,000 feet

Average annual precipitation: 16 to 24 inches

Average annual air temperature: 38 to 42 degrees F

Frost-free period: 50 to 75 inches

Taxonomic class: Fine-loamy, mixed, superactive Cumulic Cryaquolls

Typical pedon

Venable loam, in an area of Venable loam, 0 to 1 percent slope; about 1,900 feet east

and 1,800 feet north of the southwest corner of sec. 29, T 5 N, R 73 W in Beaver Meadows; USGS Longs Peak topographic quadrangle; latitude 40 degrees, 22 minutes, 13 seconds N; longitude 105 degrees, 36 minutes, 2 seconds W, NAD 1927.

Oe—0 to 3 inches; moderately decomposed organic material.

A—3 to 9 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 5 percent gravel; moderately acid (pH 6.0); clear smooth boundary.

Ag—9 to 14 inches; very dark gray (7.5YR 3/1) loam, black (7.5YR 2/1) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 5 percent gravel; few fine prominent dark reddish brown (2.5YR 3/3) iron concentrations; slightly acid (pH 6.2); abrupt wavy boundary.

Bg—14 to 31 inches; gray (N 5/0) sandy clay loam, very dark gray (N 3/0) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; 10 percent gravel; common fine prominent reddish brown (5YR 4/4) iron concentrations; moderately acid (pH 5.8); clear wavy boundary.

2Cg1—31 to 43 inches; gray (N 5/0) gravelly loamy coarse sand, dark gray (N 4/0) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 20 percent gravel; neutral (pH 6.8); abrupt smooth boundary.

3Cg2—43 to 63 inches; greenish gray (5GY 6/1) very cobbly silty clay loam, greenish gray (5GY 5/1) moist; common medium prominent yellowish red (5YR 4/6) mottles; massive; very hard, firm, sticky and plastic; few very fine roots; 20 percent gravel and 25 percent cobbles; neutral (pH 6.6).

Range in Characteristics

Soil moisture regime: Aquic

Mean annual soil temperature: 36 to 40 degrees F

Thickness of the mollic epipedon: 20 to 50 inches

Particle-size control section (weighted average):

Clay content: 18 to 30 percent

Sand content: 40 to 70 percent

Rock fragments: 10 to 20 percent in the control section

Mica content: 15 to 30 percent (by grain count)

Ag Horizon:

Hue: 7.5YR or 10YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 25 percent

Reaction: moderately acid to neutral

Bg Horizon:

Hue: 10YR or neutral

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 0 or 1

Texture: sandy clay loam, loam

Clay content: 20 to 30 percent

Reaction: moderately acid to neutral

2Cg1 Horizon:

Hue: 5GY or neutral

Rock fragments: 10 to 30 percent

Texture: gravelly loamy coarse sand, gravelly loamy sand

Clay content: 3 to 10 percent

Reaction: moderately acid to neutral

3Cg2 Horizon:

Hue: 5GY or neutral

Rock fragments: 35 to 50 percent

Texture: very cobbly silty clay loam, very cobbly clay loam, very cobbly loam

Clay content: 27 to 35 percent

Reaction: moderately acid to neutral

The Venable soils in this survey area are taxadjuncts because there is a thin sandy horizon in the lower part of the particle-size control section. In this area, the Venable series is in the fine-loamy over sandy or sandy skeletal family. This difference, however, does not significantly affect the

use, management, or interpretations of the soils.

Ypsilon Series

Depth class: Very deep

Drainage class: Somewhat excessively drained

Parent material: Colluvium and till derived from granitic rocks, gneiss, and schist

Landform: Glaciated mountain slopes and moraines

Landform position: Backslopes and footslopes

Elevation: 9,700 to 11,000 feet

Slope: 20 to 50 percent

Average annual precipitation: 30 to 40 inches

Average annual air temperature: 35 to 38 degrees F

Frost-free season: 20 to 50 days

Taxonomic class: Loamy-skeletal, isotic Typic Haplocryods

Typical pedon

Ypsilon gravelly sandy loam, in an area of Ypsilon gravelly sandy loam, 20 to 50 percent slopes, about 1.1 miles south of Rainbow Curve in Rocky Mountain National Park; USGS Trailridge topographical quadrangle; latitude 40 degrees, 23 minutes, 04 seconds N; longitude 105 degrees, 39 minutes, 49 seconds W, NAD 1927.

Oe—0 to 6 inches; moderately decomposed plant material

E1—6 to 14 inches; light gray (10YR 7/2) gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine and medium and many very fine and few coarse roots; 20 percent gravel and 2 percent cobbles; very strongly acid (pH 4.9); clear wavy boundary.

E2—14 to 19 inches; light gray (10YR 7/2) very cobbly coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak medium

subangular blocky structure; soft, very friable, nonsticky and nonplastic; few coarse

and medium and many very fine and fine roots; 25 percent gravel and 15 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.

Bs1—19 to 24 inches; brown (7.5YR 5/4) very cobbly coarse sandy loam, strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; very hard, firm, moderately cemented by iron, brittle, slightly sticky and nonplastic; few medium and coarse and common fine roots; common distinct continuous iron stains on faces of peds; 20 percent gravel and 15 percent cobbles and 5 percent stones; very strongly acid (pH 4.8); gradual smooth boundary.

Bs2—24 to 35 inches; brown (7.5YR 5/4) extremely stony sandy loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky and moderate fine subangular blocky structure; hard, firm, weakly cemented by iron, brittle, slightly sticky and slightly plastic; few fine to coarse roots; few distinct continuous iron stains on faces of peds; 20 percent gravel and 25 percent cobbles and 30 percent stones; very strongly acid (pH 4.7); gradual smooth boundary.

BC—35 to 67 inches; light yellowish brown (10YR 6/4) extremely cobbly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; hard, very friable, nonsticky and nonplastic; few medium roots; 20 percent gravel and 30 percent cobbles and 10 percent stones; very strongly acid (pH 4.7).

Range in Characteristics

(Depths given are from the mineral soil surface.)

Soil moisture regime: Udic

Mean annual soil temperature: 34 to 36 degrees F

Mean summer soil temperature: 40 to 43 degrees F

Depth to spodic materials: 6 to 14 inches

Thickness of the spodic horizon: 15 to 25 inches

Thickness of the solum: 30 to 48 inches

Particle-size control section (weighted average):

Clay content: 8 to 18 percent

Sand content: 50 to 75 percent

Rock fragments: 45 to 65 percent

Mica content: 15 to 30 percent (by

grain count)

E1 Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 1 or 2

Clay content: 8 to 18 percent

Rock fragments: 15 to 35 percent, dominantly gravel and cobbles

Acid oxalate extractable Al + ½ Fe: .10 to .15 percent

Organic carbon: 0.5 to 1 percent

Base saturation: 15 to 35 percent

Reaction: extremely acid to strongly acid

E2 Horizon:

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 1 through 3

Texture: very cobbly coarse sandy loam, very cobbly sandy loam

Clay content: 8 to 18 percent

Rock fragments: 35 to 60 percent, dominantly gravel and cobbles

Acid oxalate extractable Al + ½ Fe: .25 to .40 percent

Organic carbon: 0.5 to 1.0 percent

Base saturation: 15 to 35 percent

Reaction: extremely acid or very strongly acid

Bs Horizons:

Hue: 5YR or 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 through 6

Texture: very cobbly coarse sandy loam, very cobbly sandy loam, extremely stony coarse sandy loam, extremely stony sandy loam

Clay content: 8 to 18 percent

Rock fragments: 35 to 75 percent, dominantly cobbles and gravel

Acid oxalate extractable Al + ½ Fe: .60 to .80 percent

Organic carbon: 1.0 to 1.5 percent

Base saturation: 15 to 50 percent

Reaction: extremely acid or very strongly acid

BC Horizon:

Hue: 7.5YR or 10YR

Value: 5 through 7 dry, 4 through 6 moist

Chroma: 3 through 6

Texture: extremely cobbly loamy coarse sand, extremely cobbly

loamy sand

Clay content: 1 to 5 percent

Rock fragments: 60 to 75 percent,
dominantly cobbles and gravel

Acid oxalate extractable Al + $\frac{1}{2}$ Fe:
.15 to .40 percent

Organic carbon: 0.5 to 1 percent

Base saturation: 30 to 50 percent

Reaction: very strongly acid or
strongly acid

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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 cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

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	< 2.5
Low	2.5 to 5.0
Moderate	5.0 to 7.5
High	7.5 to 10.0
Very high	> 10.0

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes 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+K), expressed as a percentage of the total cation-exchange capacity.

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.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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.

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.

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 chanter.

Cirque. Semicircular, concave, bowl-like areas that have steep faces primarily resulting from glacial ice and snow abrasion.

Clay. 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 pored or root channels. Synonyms: clay coating, clay skin.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not

change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or 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 an area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Consistence, soil. Refers to the degree of cohesion and adhesion of the soil material

and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dense layers (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

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.” The *somewhat excessively drained* class was assigned to soils that do not have a natural water table within 60 inches and that are in a moderately rapid permeability class.

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley, generally more open and with broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Ecological sites. An area of vegetation where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind or proportion of species or total production.

Ecological site name. A description of the plant community that identifies the dominant species.

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. The type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Episaturation. The type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one

or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity or more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

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.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field

moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

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.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Footslope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants covering the ground in a forest.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can

damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or

soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted and unstratified glacial drift, consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

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, up to 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be

obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent upon 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 upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. 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.

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, the number 2 precedes the letter C.

Cr horizon—Soft, consolidated bedrock beneath the soil.

R layer—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic rock and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

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 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.

Intermittent stream. A stream, or reach of a stream, that flows for protracted periods only when it receives ground water discharge or long continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Knoll. A small, low rounded hill rising above adjacent landforms.

Lamellae. A thin illuvial horizon consisting of accumulation of clay minerals occurring as horizontal lenses. It has more clay than overlying eluvial horizons and is usually in the subsoil.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

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.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The

size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Mountain base. The lower part of a mountain that is generally less sloping. It is usually the lower part of the backslope or footslope.

Mountain flank. The middle part of a mountain that comprises the main part of a mountain side. It is usually the backslope.

Mountain slope. The part of a mountain between the summit and the foot.

Mountain top. The upper part of a mountain. It is usually the shoulder or summit.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the 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 between 6.6 and 7.3. (see Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron,

manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Parent material. The unconsolidated organic and mineral matter in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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, 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.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water 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. The numerical designation of acidity and alkalinity in soil (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

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.

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.

Profile, soil. The vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

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 degree of acidity or alkalinity is expressed as:

Extremely acid	Below 4.5.
Very strongly acid	4.5 to 5.0.
Strongly acid	5.1 to 5.5.
Medium acid	5.6 to 6.0.
Slightly acid	6.1 to 6.5.
Neutral	6.6 to 7.3.
Mildly alkaline	7.4 to 7.8.
Moderately alkaline	7.9 to 8.4.
Strongly alkaline	8.5 to 9.0.
Very strongly alkaline	9.1 and higher.

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.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that only accumulates by disintegration of bedrock in place.

Road cut. The 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.

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 an area without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural

class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Second bottom. The first terrace above the normal flood plan (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shoulder. A position that forms the uppermost inclined position near the top of a hillslope or mountain. The surface is convex in nature and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperature, 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.

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.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spodic horizon. An illuvial layer that is composed of accumulations of iron, aluminum, and organic matter. It is usually the subsoil.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface.

Stones. Rock fragments 10 to 24 inches in diameter if rounded or 6 to 15 inches in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

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.
Granular—Rounded.
Structureless—Soils are either single grained or massive.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum; the C horizon.

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; or, any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. A general term for the top or the highest area of a landform.

Surface layer. The soil usually 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.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are: *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The outermost inclined surface at the base of a hill; part of a footslope.

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 landfills.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder the 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.

Umbric epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has low base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

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.

Windthrow. The action of uprooting and tipping over trees by the wind.

Tables

Table 1.--Ecological Sites And Characteristic Native Vegetation

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
1: Archrock	Alpine clover/Golden avens	---	purple reedgrass alpine bluegrass alpine clover grayleaf willow groundsel alpine fescue cinquefoil alpine sagebrush golden avens white marshmarigold	15 10 10 8 8 7 7 5 5 5
1: Fallriver	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce	grouse whortleberry dwarf blueberry Woods' rose heartleaf arnica russet buffaloberry	40 10 5 5 5
2: Archrock	Parry's clover/tufted hairgrass	---	alpine bluegrass tufted hairgrass kobresia rock sedge Parry's clover alpine clover alpine sagebrush cinquefoil golden avens	15 15 10 10 8 7 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
2: Onahu	Planeleaf willow/water sedge	---	tufted hairgrass water sedge planeleaf willow purple reedgrass American bistort alpine bluegrass beaked sedge cinquefoil rock sedge white marshmarigold	15 15 10 10 5 5 5 5 5 5
2: Rock outcrop	---	---	---	---
3: Bullwark	Lodgepole pine/elk sedge	lodgepole pine Rocky Mountain Douglas fir	elk sedge kinnikinnick bluegrass cliffbush common juniper mountain thermopsis	10 10 5 5 5 2

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
3: Catamount	Lodgepole pine/ kinnikinnick	lodgepole pine Rocky Mountain Douglas fir	kinnikinnick sedge Woods' rose bluegrass cliffbush currant spike fescue Oregongrape	10 10 5 5 5 5 3 2
4: Catamount	Lodgepole pine/ kinnikinnick	lodgepole pine Rocky Mountain Douglas fir	Ross' sedge kinnikinnick Woods' rose bluegrass cliffbush common juniper spike fescue Oregongrape	10 10 5 5 5 5 3 2
5: Catamount	Lodgepole pine/ kinnikinnick	lodgepole pine Rocky Mountain Douglas fir	Ross' sedge kinnikinnick Woods' rose bluegrass cliffbush common juniper spike fescue mountain thermopsis	10 10 5 5 5 5 3 2

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
5: Bullwark	Lodgepole pine/ kinnikinnick	lodgepole pine Rocky Mountain Douglas fir	Ross' sedge kinnikinnick Woods' rose bluegrass cliffbush common juniper spike fescue mountain thermopsis	10 10 5 5 5 5 3 2
5: Rock outcrop	---	---	---	---
6: Enentah	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce lodgepole pine	grouse whortleberry dwarf blueberry Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5
7: Enentah	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce lodgepole pine	grouse whortleberry dwarf blueberry Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
7: Rubble land	---	---	---	---
8: Fallriver	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce	grouse whortleberry dwarf blueberry Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5
9: Fallriver, warm	Lodgepole pine/ grouse whortleberry	lodgepole pine Engelmann's spruce subalpine fir	grouse whortleberry kinnikinnick Ross' sedge Woods' rose elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5
10: Fallriver	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce	grouse whortleberry dwarf blueberry Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
10: Hiamovi	Lodgepole pine/ grouse whortleberry	lodgepole pine subalpine fir Engelmann's spruce	grouse whortleberry common juniper Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	50 10 5 5 5 5 5
11: Fallriver	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce lodgepole pine	grouse whortleberry dwarf blueberry Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5
11: Rock outcrop	---	---	---	---
12: Galuche	Ponderosa pine-Rocky Mountain Douglas fir/mountain muhly	ponderosa pine Rocky Mountain Douglas fir lodgepole pine	Ross' sedge mountain muhly kinnikinnick spike fescue bluegrass cliffbush fringed sagewort prairie Junegrass	15 15 10 10 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
12: Rock outcrop	---	---	---	---
13: Granite	Lodgepole pine-common juniper	lodgepole pine Rocky Mountain Douglas fir Engelmann's spruce	bluegrass elk sedge common juniper heartleaf arnica kinnikinnick mountain thermopsis pyrola	15 15 10 5 5 5 5
14: Hiamovi	Lodgepole pine-common juniper	limber pine lodgepole pine Engelmann's spruce	grouse whortleberry sedge common juniper russet buffaloberry	70 15 10 5
14: Rock outcrop	---	---	---	---
15: Hiamovi	Lodgepole pine/ grouse whortleberry	lodgepole pine subalpine fir Engelmann's spruce	elk sedge grouse whortleberry common juniper Ross' sedge heartleaf arnica russet buffaloberry	25 15 10 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
15: Rock outcrop	---	---	---	---
16: Isolation	Ponderosa pine/mountain muhly	ponderosa pine	mountain muhly needleandthread Parry's danthonia spike fescue Ross' sedge antelope bitterbrush blue grama bluegrass currant prairie Junegrass	25 15 10 10 5 5 5 5 5 5
17: Kawuneeche	Tufted hairgrass/sedge sp.	---	tufted hairgrass Nebraska sedge bluejoint rush American mannagrass alpine timothy bluegrass shrubby cinquefoil water sedge Western wheatgrass	25 15 10 10 5 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
18: Kawuneeche	Planeleaf willow/water sedge	---	tufted hairgrass water sedge American mannagrass bluegrass rush cinquefoil grayleaf willow planeleaf willow white marshmarigold	15 15 10 10 10 5 5 5 5
19: Kawuneeche, low precipitation	Planeleaf willow/water sedge	---	water sedge American mannagrass baltic rush bluegrass planeleaf willow tufted hairgrass mountain rush rush shrubby cinquefoil slender wheatgrass	15 10 10 10 10 10 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
20: Kawuneeche	Planeleaf willow/water sedge	---	tufted hairgrass water sedge American mannagrass rush bluegrass cinquefoil grayleaf willow planeleaf willow white marshmarigold	15 15 10 10 5 5 5 5 5
20: Dystrocryepts	Tufted hairgrass/sedge sp.	---	tufted hairgrass Nebraska sedge bluegrass rush American mannagrass alpine timothy bluejoint shrubby cinquefoil water sedge Western wheatgrass	20 10 10 10 5 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
21: Legault	Lodgepole pine/ kinnikinnick	lodgepole pine Rocky Mountain Douglas fir	Ross' sedge kinnikinnick bluegrass cliffbush common juniper mountain thermopsis spike fescue Woods' rose	10 10 5 5 5 5 3 2
22: Lumpyridge	Needleandthread/ mountain muhly	---	mountain muhly needleandthread Parry's danthonia Western wheatgrass fringed sagewort prairie Junegrass slender wheatgrass antelope bitterbrush ponderosa pine	20 15 10 10 5 5 5 2 2

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
23: Lumpyridge	Needleandthread/ mountain muhly	ponderosa pine	mountain muhly needleandthread Arizona fescue Parry's danthonia antelope bitterbrush fringed sagewort ponderosa pine prairie Junegrass slender wheatgrass Western wheatgrass	20 15 10 10 5 5 5 5 5 5
23: Rofork	Ponderosa pine/antelope bitterbrush	ponderosa pine	mountain muhly needleandthread Parry's danthonia prairie Junegrass antelope bitterbrush blue grama bluegrass mountain big sagebrush mountain thermopsis ponderosa pine wheatgrass	25 15 10 10 5 5 5 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
24: Mummy	Kobresia/golden avens/ rock sedge	---	kobresia tufted hairgrass alpine bluegrass golden avens rock sedge American bistort alpine clover cinquefoil purple reedgrass	15 15 10 10 10 5 5 5 5
25: Mummy	Kobresia/golden avens/ rock sedge	---	kobresia tufted hairgrass alpine bluegrass golden avens rock sedge American bistort alpine clover cinquefoil purple reedgrass	15 15 10 10 10 5 5 5 5
26: Nanita	Lodgepole pine/elk sedge	lodgepole pine Rocky Mountain Douglas fir Engelmann's spruce	elk sedge common juniper kinnikinnick cliffbush heartleaf arnica mountain thermopsis Woods' rose Oregongrape	15 8 7 5 5 5 3 2

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
27: Nanita	Lodgepole pine/elk sedge	lodgepole pine Rocky Mountain Douglas fir Engelmann's spruce	elk sedge common juniper kinnikinnick cliffbush heartleaf arnica mountain thermopsis Woods' rose Oregongrape	15 8 7 5 5 5 3 2
28: Nanita	Lodgepole pine/elk sedge	lodgepole pine Rocky Mountain Douglas fir Engelmann's spruce	elk sedge common juniper kinnikinnick cliffbush heartleaf arnica mountain thermopsis Woods' rose Oregongrape	15 10 8 5 5 5 3 2
29: Nanita	Lodgepole pine/elk sedge	lodgepole pine Rocky Mountain Douglas fir Engelmann's spruce	elk sedge common juniper kinnikinnick cliffbush heartleaf arnica mountain thermopsis Woods' rose Oregongrape	15 8 7 5 5 5 3 2

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
29: Rock outcrop	---	---	---	---
30: Onahu	Tufted hairgrass/ marshmarigold	---	tufted hairgrass water sedge groundsel purple reedgrass alpine bluegrass beaked sedge cinquefoil planeleaf willow rock sedge white marshmarigold	20 15 10 10 5 5 5 5 5 5
30: Terric Cryofibrists	Planeleaf willow/water sedge	---	planeleaf willow tufted hairgrass water sedge grayleaf willow beaked sedge cinquefoil common spikerush rock sedge white marshmarigold	20 20 15 10 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
30: Trailridge	Golden avens/rock sedge	---	alpine bluegrass rock sedge golden avens kobresia griffith wheatgrass alpine clover alpine sagebrush	20 15 10 10 5 5 5
31: Peeler	Lodgepole pine/grouse whortleberry	Engelmann's spruce subalpine fir lodgepole pine	grouse whortleberry elk sedge common juniper russet buffaloberry Oregongrape Woods' rose kinnikinnick	20 10 8 7 5 5 5
32: Rock outcrop	---	---	---	---

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
32: Cathedral	Ponderosa pine/antelope bitterbrush	ponderosa pine	mountain muhly needleandthread Parry's danthonia spike fescue antelope bitterbrush bluegrass brome common juniper fringed sagewort mountain thermopsis sedge	25 15 10 10 5 5 5 5 5 5 5
33: Rock outcrop	---	---	---	---
33: Rubble land	---	---	---	---
34: Rock outcrop	---	---	---	---
34: Rubble land	---	---	---	---

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
34: Enentah	Lodgepole pine/grouse whortleberry	lodgepole pine Engelmann's spruce subalpine fir	grouse whortleberry Ross' sedge Woods' rose bluegrass common juniper elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5 5
35: Rofork	Ponderosa pine/antelope bitterbrush	ponderosa pine	mountain muhly Parry's danthonia mountain big sagebrush needleandthread prairie Junegrass antelope bitterbrush blue grama bluegrass mountain thermopsis ponderosa pine wheatgrass	25 10 10 10 5 5 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
35: Chasmfalls	Ponderosa pine/antelope bitterbrush	ponderosa pine	mountain muhly Parry's danthonia mountain big sagebrush needleandthread prairie Junegrass antelope bitterbrush blue grama bluegrass mountain thermopsis ponderosa pine wheatgrass	25 10 10 10 5 5 5 5 5 5 5 5
36: Rofork	Ponderosa pine/antelope bitterbrush	ponderosa pine	mountain muhly Parry's danthonia needleandthread prairie Junegrass antelope bitterbrush blue grama bluegrass mountain big sagebrush mountain thermopsis ponderosa pine wheatgrass	25 10 10 10 5 5 5 5 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
36: Isolation	Ponderosa pine/mountain muhly	ponderosa pine	mountain muhly needleandthread Parry's danthonia spike fescue Ross' sedge antelope bitterbrush bluegrass common juniper currant prairie Junegrass	25 15 10 10 5 5 5 5 5 5
37: Rubble land	---	---	---	---
38: Terric Cryofibrists	Planeleaf willow/water sedge	---	tufted hairgrass Baltic rush water sedge American mannagrass beaked sedge planeleaf willow shrubby cinquefoil waterbirch	20 15 15 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
39: Tileston	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce limber pine	grouse whortleberry dwarf blueberry Oregongrape Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5 5
40: Tonahutu	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce lodgepole pine	grouse whortleberry dwarf blueberry Ross' sedge bluegrass common juniper elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5 5
41: Tonahutu	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce lodgepole pine	grouse whortleberry dwarf blueberry Ross' sedge bluegrass common juniper elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
42: Trailridge	Golden avens/rock sedge	---	alpine bluegrass alpine sagebrush golden avens rock sedge tufted hairgrass American bistort alpine clover alpine fescue	10 10 10 10 10 5 5 5
42: Archrock	Alpine clover/golden avens	---	rock sedge alpine bluegrass alpine clover alpine fescue golden avens tufted hairgrass American bistort alpine sagebrush cinquefoil	15 10 10 10 10 10 5 5 5
43: Trailridge	Golden avens/rock sedge	---	kobresia alpine bluegrass tufted hairgrass griffith wheatgrass Ross' avens alpine clover alpine sagebrush	20 15 10 5 5 5 5

Table 1.--Ecological Sites And Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological Site Name	Characteristic Native Vegetation		
		Trees	Shrubs, Forbs, and Grasses	Compo- sition (pct.)
43: Mummy	Kobresia/golden avens/ rock sedge	---	kobresia tufted hairgrass alpine bluegrass golden avens rock sedge American bistort alpine clover cinquefoil purple reedgrass	15 15 10 10 10 5 5 5 5
44: Venable	Planeleaf willow/water sedge	---	tufted hairgrass water sedge American mannagrass rush bluegrass cinquefoil grayleaf willow planeleaf willow sedge white marshmarigold	15 15 10 10 5 5 5 5 5 5
45: Ypsilon	Subalpine fir-Engelmann's spruce/grouse whortleberry	subalpine fir Engelmann's spruce limber pine	grouse whortleberry dwarf blueberry Ross' sedge bluegrass elk sedge heartleaf arnica russet buffaloberry	40 10 5 5 5 5 5

Table 2.—Recreation, Part I

(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	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Archrock	50	Very limited: Slope Gravel content	1.00 0.00	Very limited: Slope Gravel content	1.00 0.00	Very limited: Slope Gravel content Depth to bedrock Content of large stones	1.00 1.00 0.84 0.68
1: Fallriver	35	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
2: Archrock	35	Very limited: Slope Gravel content	1.00 0.00	Very limited: Slope Gravel content	1.00 0.00	Very limited: Slope Gravel content Depth to bedrock Content of large stones	1.00 1.00 0.84 0.68
2: Onahu	25	Very limited: Depth to saturated zone Slope	1.00 1.00	Very limited: Slope Depth to saturated zone	1.00 1.00	Very limited: Slope Depth to saturated zone Content of large stones	1.00 1.00 0.08

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2: Rock outcrop	20	Not rated.		Not rated.		Not rated.	
3: Bullwark	50	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Depth to bedrock	1.00 0.95
3: Catamount	40	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00
4: Catamount	90	Very limited: Depth to bedrock Slope	1.00 0.63	Very limited: Depth to bedrock Slope	1.00 0.63	Very limited: Depth to bedrock Slope	1.00 1.00
5: Catamount	45	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00
5: Bullwark	30	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Depth to bedrock	1.00 0.95
5: Rock outcrop	15	Not rated.		Not rated.		Not rated.	

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Enentah	85	Very limited: Content of large stones Slope	1.00 1.00	Very limited: Content of large stones Slope	1.00 1.00	Very limited: Content of large stones Slope	1.00 1.00
7: Enentah	70	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Content of large stones Slope	1.00 1.00
7: Rubble land	15	Not rated.		Not rated.		Not rated.	
8: Fallriver	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
9: Fallriver, warm	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
10: Fallriver	50	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
10: Hiamovi	30	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 1.00 0.79

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
11: Fallriver	60	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
11: Rock outcrop	25	Not rated.		Not rated.		Not rated.	
12: Galuche	55	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00
12: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
13: Granile	85	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Content of large stones	1.00 0.46
14: Hiamovi	55	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Depth to bedrock Slope Content of large stones	1.00 1.00 1.00 0.79
14: Rock outcrop	30	Not rated.		Not rated.		Not rated.	

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
15: Hiamovi	50	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 1.00 0.79
15: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
16: Isolation	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
17: Kawuneeche	90	Very limited: Depth to saturated zone Flooding	1.00 1.00	Somewhat limited: Depth to saturated zone	0.90	Very limited: Depth to saturated zone Flooding	1.00 0.60
18: Kawuneeche	90	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19: Kawuneeche, low precipitation	90	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
20: Kawuneeche	50	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding Slope	1.00 1.00 1.00 0.03
20: Dystrocrypts	40	Somewhat limited: Flooding Slope	1.00 0.16	Somewhat limited: Slope	0.16	Somewhat limited: Slope Content of large stones	1.00 0.08
21: Legault	90	Very limited: Slope Depth to bedrock Restricted permeability	1.00 1.00 0.82	Very limited: Slope Depth to bedrock Restricted permeability	1.00 1.00 0.82	Very limited: Slope Depth to bedrock Restricted permeability	1.00 1.00 0.82

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
22: Lumpyridge	90	Somewhat limited: Gravel content	0.22	Somewhat limited: Gravel content	0.22	Somewhat limited: Gravel content Slope Content of large stones	1.00 0.50 0.00
23: Lumpyridge	60	Somewhat limited: Gravel content Slope	0.22 0.04	Somewhat limited: Gravel content Slope	0.22 0.04	Very limited: Gravel content Slope Content of large stones	1.00 1.00 0.00
23: Rofork	25	Very limited: Gravel content Depth to bedrock Slope	1.00 1.00 0.16	Very limited: Gravel content Depth to bedrock Slope	1.00 1.00 0.16	Very limited: Gravel content Depth to bedrock Slope Content of large stones	1.00 1.00 1.00 0.00
24: Mummy	85	Very limited: Slope Content of large stones	1.00 0.95	Very limited: Slope Content of large stones	1.00 0.95	Very limited: Slope Content of large stones Gravel content	1.00 1.00 0.58

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
25: Mummy	85	Very limited: Slope Gravel content	1.00 0.13	Very limited: Slope Gravel content	1.00 0.13	Very limited: Slope Gravel content Content of large stones	1.00 0.13 0.08
26: Nanita	85	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
27: Nanita	100	Not limited.		Not limited.		Very limited: Slope	1.00
28: Nanita	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
29: Nanita	75	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
29: Rock outcrop	15	Not rated.		Not rated.		Not rated.	
30: Onahu	35	Very limited: Depth to saturated zone Slope	1.00 0.96	Very limited: Depth to saturated zone Slope	1.00 0.96	Very limited: Depth to saturated zone Slope Content of large stones	1.00 1.00 0.08

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30: Terric Cryofibrists	25	Very limited: Ponding Content of organic matter Depth to saturated zone	1.00 1.00 1.00	Very limited: Ponding Content of organic matter Depth to saturated zone	1.00 1.00 1.00	Very limited: Ponding Content of organic matter Depth to saturated zone Slope	1.00 1.00 1.00 0.50
30: Trailridge	20	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 1.00 0.79
31: Peeler	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
32: Rock outcrop	45	Not rated.		Not rated.		Not rated.	
32: Cathedral	40	Very limited: Slope Depth to bedrock Gravel content	1.00 1.00 1.00	Very limited: Slope Depth to bedrock Gravel content	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 1.00 0.54

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
33: Rock outcrop	40	Not rated.		Not rated.		Not rated.	
33: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
34: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Enentah	25	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Content of large stones Slope	1.00 1.00
35: Rofork	60	Very limited: Gravel content Slope Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Depth to bedrock Slope Content of large stones	1.00 1.00 1.00 0.00

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35: Chasmfalls	30	Very limited: Slope Restricted permeability Gravel content	1.00 0.27 0.24	Very limited: Slope Restricted permeability Gravel content	1.00 0.27 0.24	Very limited: Gravel content Slope Depth to bedrock Restricted permeability	1.00 1.00 0.64 0.27
36: Rofork	60	Very limited: Gravel content Slope Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Depth to bedrock Slope Content of large stones	1.00 1.00 1.00 0.00
36: Isolation	30	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
37: Rubble land	95	Not rated.		Not rated.		Not rated.	
38: Terric Cryofibrists	90	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
39: Tileston	85	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Content of large stones	1.00 0.08
40: Tonahutu	85	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
41: Tonahutu	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
42: Trailridge	40	Very limited: Gravel content Slope Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 1.00 0.79
42: Archrock	35	Very limited: Slope Gravel content	1.00 0.00	Very limited: Slope Gravel content	1.00 0.00	Very limited: Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 0.84 0.68

Table 2.—Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
43: Trailridge	45	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Slope Gravel content Depth to bedrock	1.00 1.00 1.00	Very limited: Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 1.00 0.79
43: Mummy	40	Very limited: Slope Gravel content	1.00 0.13	Very limited: Slope Gravel content	1.00 0.13	Very limited: Slope Gravel content Content of large stones	1.00 1.00 0.08
44: Venable	90	Very limited: Depth to saturated zone Flooding	1.00 1.00	Very limited: Depth to saturated zone	1.00	Very limited: Depth to saturated zone Flooding	1.00 0.60
45: Ypsilon	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00

Table 3.—Recreation, Part II

(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	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Archrock	50	Very limited: Slope	1.00	Not limited.		Very limited: Slope Droughty Depth to bedrock Content of large stones Gravel content	1.00 0.98 0.84 0.68 0.00
1: Fallriver	35	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.78	Very limited: Slope Content of organic matter Droughty	1.00 1.00 0.93
2: Archrock	35	Very limited: Slope	1.00	Not limited.		Very limited: Slope Droughty Depth to bedrock Content of large stones Gravel content	1.00 0.98 0.84 0.68 0.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2: Onahu	25	Very limited: Depth to saturated zone Slope	1.00 0.08	Very limited: Depth to saturated zone	1.00	Very limited: Slope Depth to saturated zone Droughty Content of large stones	1.00 1.00 0.09 0.08
2: Rock outcrop	20	Not rated.		Not rated.		Not rated.	
3: Bullwark	50	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.78	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 0.95
3: Catamount	40	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.78	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 1.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4: Catamount	90	Very limited: Water erosion	1.00	Not limited.		Very limited: Content of organic matter Droughty Depth to bedrock Slope	1.00 1.00 1.00 0.63
5: Catamount	45	Very limited: Water erosion Slope	1.00 1.00	Not limited.		Very limited: Content of organic matter Droughty Depth to bedrock Slope	1.00 1.00 1.00 1.00
5: Bullwark	30	Very limited: Water erosion Slope	1.00 1.00	Not limited.		Very limited: Content of organic matter Droughty Slope Depth to bedrock	1.00 1.00 1.00 0.95
5: Rock outcrop	15	Not rated.		Not rated.		Not rated.	

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Enentah	85	Very limited: Content of large stones Slope	1.00 1.00	Very limited: Content of large stones	1.00	Very limited: Content of large stones Slope Droughty	1.00 1.00 1.00
7: Enentah	70	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Content of large stones Slope	1.00 0.86	Very limited: Slope Content of large stones Droughty	1.00 1.00 1.00
7: Rubble land	15	Not rated.		Not rated.		Not rated.	
8: Fallriver	90	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.04	Very limited: Content of organic matter Slope Droughty	1.00 1.00 0.93
9: Fallriver, warm	90	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.04	Very limited: Content of organic matter Slope Droughty	1.00 1.00 0.93

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10: Fallriver	50	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.44	Very limited: Content of organic matter Slope Droughty	1.00 1.00 0.93
10: Hiamovi	30	Very limited: Slope	1.00	Somewhat limited: Slope	0.78	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79
11: Fallriver	60	Very limited: Slope Water erosion	1.00 1.00	Very limited: Slope	1.00	Very limited: Slope Content of organic matter Droughty	1.00 1.00 0.93
11: Rock outcrop	25	Not rated.		Not rated.		Not rated.	

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
12: Galuche	55	Very limited: Water erosion Slope	1.00 1.00	Very limited: Slope	1.00	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 1.00
12: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
13: Granile	85	Very limited: Slope Water erosion	1.00 1.00	Very limited: Slope	1.00	Very limited: Slope Content of organic matter Droughty Content of large stones	1.00 1.00 0.71 0.46
14: Hiamovi	55	Somewhat limited: Slope	0.82	Not limited.		Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.79
14: Rock outcrop	30	Not rated.		Not rated.		Not rated.	

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
15: Hiamovi	50	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79
15: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
16: Isolation	90	Very limited: Water erosion Slope	1.00 0.50	Not limited.		Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00
17: Kawuneeche	90	Somewhat limited: Depth to saturated zone	0.78	Somewhat limited: Depth to saturated zone	0.78	Somewhat limited: Depth to saturated zone Flooding Droughty	0.90 0.60 0.48

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18: Kawuneeche	90	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
19: Kawuneeche, low precipitation	90	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
20: Kawuneeche	50	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
20: Dystrocrypts	40	Not limited.		Not limited.		Somewhat limited: Slope Content of large stones	0.16 0.08

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21: Legault	90	Very limited: Water erosion Slope	1.00 0.50	Somewhat limited: Slope	0.22	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 1.00
22: Lumpyridge	90	Not limited.		Not limited.		Somewhat limited: Gravel content Droughty Content of large stones	0.22 0.01 0.00
23: Lumpyridge	60	Not limited.		Not limited.		Somewhat limited: Gravel content Slope Droughty Content of large stones	0.22 0.04 0.01 0.00
23: Rofork	25	Not limited.		Not limited.		Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 0.16 0.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24: Mummy	85	Very limited: Slope Content of large stones	1.00 0.95	Very limited: Content of large stones Slope	0.95 0.78	Very limited: Slope Content of large stones Droughty	1.00 1.00 1.00
25: Mummy	85	Somewhat limited: Slope	0.82	Not limited.		Very limited: Slope Droughty Gravel content Content of large stones	1.00 0.26 0.13 0.08
26: Nanita	85	Very limited: Slope Water erosion	1.00 1.00	Very limited: Slope	1.00	Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00
27: Nanita	100	Not limited.		Not limited.		Very limited: Content of organic matter Droughty	1.00 1.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
28: Nanita	90	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.78	Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00
29: Nanita	75	Very limited: Water erosion Slope	1.00 1.00	Not limited.		Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00
29: Rock outcrop	15	Not rated.		Not rated.		Not rated.	
30: Onahu	35	Very limited: Depth to saturated zone	1.00	Very limited: Depth to saturated zone	1.00	Very limited: Depth to saturated zone Slope Droughty Content of large stones	1.00 0.96 0.09 0.08

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30: Terric Cryofibrists	25	Very limited: Content of organic matter Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited: Content of organic matter Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited: Ponding Content of organic matter Depth to saturated zone	1.00 1.00 1.00
30: Trailridge	20	Very limited: Slope	1.00	Not limited.		Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79
31: Peeler	90	Very limited: Water erosion Slope	1.00 0.82	Not limited.		Very limited: Content of organic matter Slope	1.00 1.00
32: Rock outcrop	45	Not rated.		Not rated.		Not rated.	

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
32: Cathedral	40	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.54
33: Rock outcrop	40	Not rated.		Not rated.		Not rated.	
33: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
34: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Enentah	25	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Content of large stones Slope	1.00 1.00	Very limited: Slope Content of large stones Droughty	1.00 1.00 1.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35: Rofork	60	Somewhat limited: Slope	0.50	Not limited.		Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.00
35: Chasmfalls	30	Not limited.		Not limited.		Very limited: Slope Droughty Depth to bedrock Gravel content	1.00 0.91 0.64 0.24
36: Rofork	60	Somewhat limited: Slope	0.50	Not limited.		Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.00
36: Isolation	30	Very limited: Water erosion Slope	1.00 0.50	Not limited.		Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
37: Rubble land	95	Not rated.		Not rated.		Not rated.	
38: Terric Cryofibrists	90	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
39: Tileston	85	Very limited: Water erosion Slope	1.00 1.00	Not limited.		Very limited: Content of organic matter Droughty Slope Content of large stones	1.00 1.00 1.00 0.08
40: Tonahutu	85	Very limited: Water erosion Slope	1.00 0.92	Not limited.		Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
41: Tonahutu	90	Very limited: Slope Water erosion	1.00 1.00	Very limited: Slope	1.00	Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00
42: Trailridge	40	Very limited: Slope	1.00	Not limited.		Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.79
42: Archrock	35	Very limited: Slope	1.00	Not limited.		Very limited: Slope Droughty Depth to bedrock Content of large stones Gravel content	1.00 0.98 0.84 0.68 0.00

Table 3.—Recreation, Part II --Continued

Map symbol and soil name	Pct. of map unit	Paths and Trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
43: Trailridge	45	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79
43: Mummy	40	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope Droughty Gravel content Content of large stones	1.00 0.26 0.13 0.08
44: Venable	90	Very limited: Depth to saturated zone	1.00	Very limited: Depth to saturated zone	1.00	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.60
45: Ypsilon	90	Very limited: Water erosion Slope	1.00 1.00	Somewhat limited: Slope	0.78	Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00

Table 4.--Building Site Development, Part I

(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	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Archrock	50	Very limited: Slope	1.00	Very limited: Slope Depth to soft bedrock	1.00 0.84	Very limited: Slope	1.00
1: Fallriver	35	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85
2: Archrock	35	Very limited: Slope	1.00	Very limited: Slope Depth to soft bedrock	1.00 0.84	Very limited: Slope	1.00
2: Onahu	25	Very limited: Depth to saturated zone Slope	1.00 1.00	Very limited: Depth to saturated zone Slope	1.00 1.00	Very limited: Slope Depth to saturated zone	1.00 1.00
2: Rock outcrop	20	Not rated.		Not rated.		Not rated.	

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3: Bullwark	50	Very limited: Slope Depth to soft bedrock	1.00 0.84	Very limited: Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 0.95	Very limited: Slope Depth to hard bedrock	1.00 0.29
3: Catamount	40	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00
4: Catamount	90	Very limited: Depth to soft bedrock Slope	1.00 0.63	Very limited: Depth to soft bedrock Slope	1.00 0.63	Very limited: Slope Depth to soft bedrock	1.00 1.00
5: Catamount	45	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Depth to soft bedrock Slope	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00
5: Bullwark	30	Very limited: Slope Depth to hard bedrock	1.00 0.29	Very limited: Depth to hard bedrock Slope Depth to soft bedrock	1.00 1.00 0.95	Very limited: Slope Depth to hard bedrock	1.00 0.29

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
5: Rock outcrop	15	Not rated.		Not rated.		Not rated.	
6: Enentah	85	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
7: Enentah	70	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
7: Rubble land	15	Not rated.		Not rated.		Not rated.	
8: Fallriver	90	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85
9: Fallriver, warm	90	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10: Fallriver	50	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85
10: Hiamovi	30	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00
11: Fallriver	60	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Content of large stones	1.00 0.85
11: Rock outcrop	25	Not rated.		Not rated.		Not rated.	
12: Galuche	55	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00
12: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
13: Granile	85	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
14: Hiamovi	55	Very limited: Depth to hard bedrock Slope	1.00 1.00	Very limited: Depth to hard bedrock Slope	1.00 1.00	Very limited: Depth to hard bedrock Slope	1.00 1.00
14: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
15: Hiamovi	50	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00
15: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
16: Isolation	90	Very limited: Slope Content of large stones	1.00 0.63	Very limited: Slope Content of large stones	1.00 0.63	Very limited: Slope Content of large stones	1.00 0.63
17: Kawuneeche	90	Very limited: Depth to saturated zone Flooding	1.00 0.60	Very limited: Depth to saturated zone Flooding	1.00 0.60	Very limited: Depth to saturated zone Flooding	1.00 0.60

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18: Kawuneeche	90	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80
19: Kawuneeche, low precipitation	90	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80
20: Kawuneeche	50	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80
20: Dystrocryepts	40	Somewhat limited: Flooding Slope	0.40 0.16	Somewhat limited: Depth to saturated zone Flooding Slope	0.95 0.40 0.16	Very limited: Slope Flooding	1.00 0.40
21: Legault	90	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00
22: Lumpyridge	90	Not limited.		Not limited.		Not limited.	

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
23: Lumpyridge	60	Somewhat limited: Shrink-swell Slope	0.22 0.04	Somewhat limited: Shrink-swell Slope	0.22 0.04	Very limited: Slope Shrink-swell	1.00 0.22
23: Rofork	25	Somewhat limited: Depth to soft bedrock Slope	1.00 0.16	Very limited: Depth to soft bedrock Slope	1.00 0.16	Very limited: Slope Depth to soft bedrock	1.00 1.00
24: Mummy	85	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
25: Mummy	85	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
26: Nanita	85	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
27: Nanita	100	Very limited: Content of large stones	1.00	Very limited: Content of large stones	1.00	Very limited: Content of large stones Slope	1.00 1.00

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
28: Nanita	90	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
29: Nanita	75	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
29: Rock outcrop	15	Not rated.		Not rated.		Not rated.	
30: Onahu	35	Very limited: Depth to saturated zone Slope	1.00 0.96	Very limited: Depth to saturated zone Slope	1.00 0.96	Very limited: Depth to saturated zone Slope	1.00 1.00
30: Terric Cryofibrists	25	Very limited: Ponding Depth to saturated zone	1.00 1.00	Very limited: Ponding Depth to saturated zone	1.00 1.00	Very limited: Ponding Depth to saturated zone	1.00 1.00
30: Trailridge	20	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31: Peeler	90	Very limited: Slope Shrink-swell	1.00 0.22	Very limited: Slope Shrink-swell	1.00 0.22	Very limited: Slope Shrink-swell	1.00 0.22
32: Rock outcrop	45	Not rated.		Not rated.		Not rated.	
32: Cathedral	40	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00	Very limited: Slope Depth to hard bedrock	1.00 1.00
33: Rock outcrop	40	Not rated.		Not rated.		Not rated.	
33: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
34: Rubble land	30	Not rated.		Not rated.		Not rated.	

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
34: Enentah	25	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
35: Rofork	60	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Depth to soft bedrock Slope	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00
35: Chasmfalls	30	Very limited: Slope	1.00	Very limited: Slope Depth to soft bedrock	1.00 0.64	Very limited: Slope	1.00
36: Rofork	60	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Depth to soft bedrock Slope	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00
36: Isolation	30	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
37: Rubble land	95	Not rated.		Not rated.		Not rated.	

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
38: Terric Cryofibrists	90	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80	Very limited: Depth to saturated zone Flooding	1.00 0.80
39: Tileston	85	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00
40: Tonahutu	85	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
41: Tonahutu	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
42: Trailridge	40	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Depth to soft bedrock Slope	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00
42: Archrock	35	Very limited: Slope	1.00	Very limited: Slope Depth to soft bedrock	1.00 0.84	Very limited: Slope	1.00

Table 4.--Building Site Development, Part I--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
43: Trailridge	45	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Depth to soft bedrock Slope	1.00 1.00	Very limited: Slope Depth to soft bedrock	1.00 1.00
43: Mummy	40	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00
44: Venable	90	Very limited: Depth to saturated zone Flooding Shrink-swell	1.00 0.60 0.22	Very limited: Depth to saturated zone Flooding Shrink-swell	1.00 0.60 0.22	Very limited: Depth to saturated zone Flooding Shrink-swell	1.00 0.60 0.22
45: Ypsilon	90	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones	1.00 1.00

Table 5.--Building Site Development, Part II

(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	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Archrock	50	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited: Slope Droughty Depth to bedrock Content of large stones Gravel content	1.00 0.98 0.84 0.68 0.00
1: Fallriver	35	Very limited: Slope Content of large stones Frost action	1.00 0.85 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 0.85 0.10	Very limited: Slope Content of organic matter Droughty	1.00 1.00 0.93
2: Archrock	35	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited: Slope Droughty Depth to bedrock Content of large stones Gravel content	1.00 0.98 0.84 0.68 0.00

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2: Onahu	25	Very limited: Slope Depth to saturated zone Frost action	1.00 1.00 0.50	Very limited: Content of large stones Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Depth to saturated zone Droughty Content of large stones	1.00 1.00 0.09 0.08
2: Rock outcrop	20	Not rated.		Not rated.		Not rated.	
3: Bullwark	50	Very limited: Slope Frost action Depth to hard bedrock	1.00 0.50 0.29	Very limited: Slope Depth to hard bedrock Depth to soft bedrock Cutbanks cave	1.00 1.00 0.95 0.10	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 0.95
3: Catamount	40	Very limited: Slope Depth to soft bedrock Frost action	1.00 1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 1.00

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4: Catamount	90	Very limited: Depth to soft bedrock Slope Frost action	1.00 0.63 0.50	Very limited: Depth to soft bedrock Slope Cutbanks cave	1.00 0.63 0.10	Very limited: Content of organic matter Droughty Depth to bedrock Slope	1.00 1.00 1.00 0.63
5: Catamount	45	Very limited: Slope Depth to soft bedrock Frost action	1.00 1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.10	Very limited: Content of organic matter Droughty Depth to bedrock Slope	1.00 1.00 1.00 1.00
5: Bullwark	30	Very limited: Slope Frost action Depth to hard bedrock	1.00 0.50 0.29	Very limited: Depth to hard bedrock Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.95 0.10	Very limited: Content of organic matter Droughty Slope Depth to bedrock	1.00 1.00 1.00 0.95
5: Rock outcrop	15	Not rated.		Not rated.		Not rated.	

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Enentah	85	Very limited: Slope Content of large stones Frost action	1.00 1.00 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 1.00 0.10	Very limited: Content of large stones Slope Droughty	1.00 1.00 1.00
7: Enentah	70	Very limited: Slope Content of large stones Frost action	1.00 1.00 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 1.00 0.10	Very limited: Content of large stones Slope Droughty	1.00 1.00 1.00
7: Rubble land	15	Not rated.		Not rated.		Not rated.	
8: Fallriver	90	Very limited: Slope Content of large stones Frost action	1.00 0.85 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 0.85 0.10	Very limited: Content of organic matter Slope Droughty	1.00 1.00 0.93
9: Fallriver, warm	90	Very limited: Slope Content of large stones Frost action	1.00 0.85 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 0.85 0.10	Very limited: Content of organic matter Slope Droughty	1.00 1.00 0.93

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10: Fallriver	50	Very limited: Slope Content of large stones Frost action	1.00 0.85 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 0.85 0.10	Very limited: Content of organic matter Slope Droughty	1.00 1.00 0.93
10: Hiamovi	30	Very limited: Slope Depth to hard bedrock Frost action	1.00 1.00 0.50	Very limited: Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79
11: Fallriver	60	Very limited: Slope Content of large stones Frost action	1.00 0.85 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 0.85 0.10	Very limited: Slope Content of organic matter Droughty	1.00 1.00 0.93
11: Rock outcrop	25	Not rated.		Not rated.		Not rated.	

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
12: Galuche	55	Very limited: Slope Depth to hard bedrock Frost action	1.00 1.00 0.50	Very limited: Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 1.00
12: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
13: Granile	85	Very limited: Slope Frost action	1.00 1.00	Very limited: Slope Cutbanks cave	1.00 1.00	Very limited: Slope Content of organic matter Droughty Content of large stones	1.00 1.00 0.71 0.46
14: Hiamovi	55	Very limited: Depth to hard bedrock Slope Frost action	1.00 1.00 0.50	Very limited: Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.79
14: Rock outcrop	30	Not rated.		Not rated.		Not rated.	

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
15: Hiamovi	50	Very limited: Slope Depth to hard bedrock Frost action	1.00 1.00 0.50	Very limited: Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79
15: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
16: Isolation	90	Very limited: Slope Content of large stones Frost action	1.00 0.63 0.50	Very limited: Cutbanks cave Slope Content of large stones	1.00 1.00 0.63	Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00
17: Kawuneeche	90	Very limited: Flooding Depth to saturated zone Frost action	1.00 0.90 0.50	Very limited: Depth to saturated zone Flooding Cutbanks cave	1.00 0.60 0.10	Somewhat limited: Depth to saturated zone Flooding Droughty	0.90 0.60 0.48

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18: Kawuneeche	90	Very limited: Depth to saturated zone Flooding Frost action	1.00 1.00 0.50	Very limited: Depth to saturated zone Flooding Cutbanks cave	1.00 0.80 0.10	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
19: Kawuneeche, low precipitation	90	Very limited: Frost action Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited: Depth to saturated zone Flooding Cutbanks cave	1.00 0.80 0.10	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
20: Kawuneeche	50	Very limited: Depth to saturated zone Flooding Frost action	1.00 1.00 0.50	Very limited: Depth to saturated zone Flooding Cutbanks cave	1.00 0.80 0.10	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
20: Dystrocryepts	40	Somewhat limited: Frost action Flooding Slope	0.50 0.40 0.16	Somewhat limited: Depth to saturated zone Slope Cutbanks cave	0.95 0.16 0.10	Somewhat limited: Slope Content of large stones	0.16 0.08

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21: Legault	90	Very limited: Slope Depth to soft bedrock	1.00 1.00	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Content of organic matter Droughty Depth to bedrock	1.00 1.00 1.00 1.00
22: Lumpyridge	90	Somewhat limited: Frost action	0.50	Somewhat limited: Cutbanks cave	0.10	Somewhat limited: Gravel content Droughty Content of large stones	0.22 0.01 0.00
23: Lumpyridge	60	Somewhat limited: Frost action Shrink-swell Slope	0.50 0.22 0.04	Somewhat limited: Cutbanks cave Slope	0.10 0.04	Somewhat limited: Gravel content Slope Droughty Content of large stones	0.22 0.04 0.01 0.00
23: Rofork	25	Somewhat limited: Depth to soft bedrock Frost action Slope	1.00 0.50 0.16	Very limited: Depth to soft bedrock Slope Cutbanks cave	1.00 0.16 0.10	Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 0.16 0.00

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24: Mummy	85	Very limited: Slope Content of large stones Frost action	1.00 1.00 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Content of large stones Droughty	1.00 1.00 1.00
25: Mummy	85	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Cutbanks cave	1.00 0.10	Very limited: Slope Droughty Gravel content Content of large stones	1.00 0.26 0.13 0.08
26: Nanita	85	Very limited: Slope Content of large stones	1.00 0.15	Very limited: Slope Content of large stones Cutbanks cave	1.00 0.15 0.10	Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00
27: Nanita	100	Very limited: Content of large stones	1.00	Very limited: Content of large stones Cutbanks cave	1.00 0.10	Very limited: Slope Content of organic matter	1.00 1.00

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
28: Nanita	90	Very limited: Slope Content of large stones	1.00 0.08	Very limited: Slope Cutbanks cave Content of large stones	1.00 0.10 0.08	Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00
29: Nanita	75	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Content of large stones Cutbanks cave	1.00 1.00 0.10	Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00
29: Rock outcrop	15	Not rated.		Not rated.		Not rated.	
30: Onahu	35	Very limited: Depth to saturated zone Slope Frost action	1.00 0.96 0.50	Very limited: Depth to saturated zone Slope Cutbanks cave	1.00 0.96 0.10	Very limited: Depth to saturated zone Slope Droughty Content of large stones	1.00 0.96 0.09 0.08

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30: Terric Cryofibrists	25	Very limited: Ponding Frost action Depth to saturated zone	1.00 1.00 1.00	Very limited: Ponding Depth to saturated zone Cutbanks cave	1.00 1.00 0.10	Very limited: Ponding Content of organic matter Depth to saturated zone	1.00 1.00 1.00
30: Trailridge	20	Very limited: Slope Depth to soft bedrock Frost action	1.00 1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79
31: Peeler	90	Very limited: Slope Frost action Shrink-swell	1.00 0.50 0.22	Very limited: Slope Cutbanks cave	1.00 0.10	Very limited: Slope Content of organic matter	1.00 1.00
32: Rock outcrop	45	Not rated.		Not rated.		Not rated.	

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
32: Cathedral	40	Very limited: Slope Depth to hard bedrock Frost action	1.00 1.00 0.50	Very limited: Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.54
33: Rock outcrop	40	Not rated.		Not rated.		Not rated.	
33: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
34: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Enentah	25	Very limited: Slope Content of large stones Frost action	1.00 1.00 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Content of large stones Droughty	1.00 1.00 1.00

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35: Rofork	60	Very limited: Slope Depth to soft bedrock Frost action	1.00 1.00 0.50	Very limited: Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.00
35: Chasmfalls	30	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 0.64 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content	1.00 0.91 0.64 0.24
36: Rofork	60	Very limited: Slope Depth to soft bedrock Frost action	1.00 1.00 0.50	Very limited: Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.00
36: Isolation	30	Very limited: Slope Content of large stones Frost action	1.00 0.67 0.50	Very limited: Cutbanks cave Slope Depth to soft bedrock	1.00 1.00 0.67	Very limited: Content of organic matter Droughty Slope	1.00 1.00 1.00

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
37: Rubble land	95	Not rated.		Not rated.		Not rated.	
38: Terric Cryofibrists	90	Very limited: Frost action Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited: Depth to saturated zone Flooding Cutbanks cave	1.00 0.80 0.10	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 1.00
39: Tileston	85	Very limited: Slope Content of large stones Frost action	1.00 1.00 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 1.00 0.10	Very limited: Content of organic matter Droughty Slope Content of large stones	1.00 1.00 1.00 0.08
40: Tonahutu	85	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Cutbanks cave	1.00 0.10	Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
41: Tonahutu	90	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Cutbanks cave	1.00 0.10	Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00
42: Trailridge	40	Very limited: Slope Depth to soft bedrock Frost action	1.00 1.00 0.50	Very limited: Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited: Droughty Depth to bedrock Gravel content Slope Content of large stones	1.00 1.00 1.00 1.00 0.79
42: Archrock	35	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 0.84 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content	1.00 0.91 0.64 0.24
43: Trailridge	45	Very limited: Slope Depth to soft bedrock Frost action	1.00 1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.79

Table 5.--Building Site Development, Part II --Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
43: Mummy	40	Very limited: Slope Frost action	1.00 0.50	Very limited: Slope Cutbanks cave	1.00 0.10	Very limited: Slope Droughty Gravel content Content of large stones	1.00 0.26 0.11 0.08
44: Venable	90	Very limited: Frost action Depth to saturated zone Flooding Shrink-swell	1.00 1.00 1.00 0.22	Very limited: Depth to saturated zone Flooding Cutbanks cave	1.00 0.60 0.10	Very limited: Content of organic matter Depth to saturated zone Flooding	1.00 1.00 0.60
45: Ypsilon	90	Very limited: Slope Content of large stones Frost action	1.00 1.00 0.50	Very limited: Slope Content of large stones Cutbanks cave	1.00 1.00 0.10	Very limited: Slope Content of organic matter Droughty	1.00 1.00 1.00

Table 6.—Sanitary Facilities, Part I

(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	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1: Archrock	50	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Seepage Depth to soft bedrock Content of large stones	1.00 1.00 1.00 0.02
1: Fallriver	35	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.99
2: Archrock	35	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Slope Seepage Depth to soft bedrock Content of large stones	1.00 1.00 1.00 0.02
2: Onahu	25	Very limited: Depth to saturated zone Slope Depth to bedrock	1.00 1.00 0.94	Very limited: Slope Seepage Depth to saturated zone Depth to soft bedrock	1.00 1.00 1.00 0.84

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2: Rock outcrop	20	Not rated.		Not rated.	
3: Bullwark	50	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Seepage Depth to soft bedrock Depth to hard bedrock Content of large stones	1.00 1.00 1.00 1.00 0.09
3: Catamount	40	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Slope Seepage	1.00 1.00 1.00
4: Catamount	90	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Seepage Slope	1.00 1.00 1.00
5: Catamount	45	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Slope Seepage	1.00 1.00 1.00

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
5: Bullwark	30	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Slope Seepage Depth to soft bedrock Depth to hard bedrock Content of large stones	1.00 1.00 1.00 1.00 0.09
5: Rock outcrop	15	Not rated.		Not rated.	
6: Enentah	85	Very limited: Filtering capacity Slope Content of large stones	1.00 1.00 1.00	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.99
7: Enentah	70	Very limited: Filtering capacity Slope Content of large stones	1.00 1.00 1.00	Very limited: Slope Seepage Content of large stones	1.00 1.00 1.00
7: Rubble land	15	Not rated.		Not rated.	
8: Fallriver	90	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.99

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
9: Fallriver, warm	90	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.99
10: Fallriver	50	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.99
10: Hiamovi	30	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
11: Fallriver	60	Very limited: Slope Content of large stones	1.00 0.85	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.99
11: Rock outcrop	25	Not rated.		Not rated.	
12: Galuche	55	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to hard bedrock Slope Seepage	1.00 1.00 1.00

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
12: Rock outcrop	30	Not rated.		Not rated.	
13: Granile	85	Very limited: Slope Restricted permeability	1.00 0.46	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.07
14: Hiamovi	55	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to hard bedrock Seepage Slope	1.00 1.00 1.00
14: Rock outcrop	30	Not rated.		Not rated.	
15: Hiamovi	50	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
15: Rock outcrop	30	Not rated.		Not rated.	
16: Isolation	90	Very limited: Filtering capacity Slope Content of large stones	1.00 1.00 0.63	Very limited: Seepage Slope Content of large stones	1.00 1.00 1.00

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
17: Kawuneeche	90	Very limited: Depth to saturated zone Filtering capacity Flooding	1.00 1.00 1.00	Very limited: Seepage Depth to saturated zone Flooding	1.00 1.00 1.00
18: Kawuneeche	90	Very limited: Depth to saturated zone Filtering capacity Flooding	1.00 1.00 1.00	Very limited: Seepage Depth to saturated zone Content of organic matter Flooding	1.00 1.00 1.00 1.00
19: Kawuneeche, low precipitation	90	Very limited: Depth to saturated zone Filtering capacity Flooding	1.00 1.00 0.80	Very limited: Seepage Depth to saturated zone Content of organic matter Flooding	1.00 1.00 1.00 0.80
20: Kawuneeche	50	Very limited: Depth to saturated zone Filtering capacity Flooding	1.00 1.00 1.00	Very limited: Seepage Depth to saturated zone Content of organic matter Flooding Slope	1.00 1.00 1.00 1.00 0.02

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
20: Dystrocrypts	40	Very limited: Depth to saturated zone Flooding Slope	1.00 0.40 0.16	Very limited: Seepage Slope Depth to saturated zone Flooding	1.00 1.00 1.00 0.40
21: Legault	90	Very limited: Restricted permeability Depth to bedrock Slope	1.00 1.00 1.00	Very limited: Depth to soft bedrock Slope	1.00 1.00
22: Lumpyridge	90	Somewhat limited: Restricted permeability	0.46	Very limited: Seepage Slope	1.00 0.31
23: Lumpyridge	60	Somewhat limited: Restricted permeability Slope	0.46 0.04	Very limited: Seepage Slope	1.00 1.00
23: Rofork	25	Very limited: Depth to bedrock Slope	1.00 0.16	Very limited: Depth to soft bedrock Seepage Slope	1.00 1.00 1.00
24: Mummy	85	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Seepage Content of large stones	1.00 1.00 1.00

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
25: Mummy	85	Very limited: Slope	1.00	Very limited: Slope Seepage	1.00 1.00
26: Nanita	85	Very limited: Slope Content of large stones	1.00 0.15	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.84
27: Nanita	100	Very limited: Content of large stones	1.00	Very limited: Seepage Slope Content of large stones	1.00 1.00 1.00
28: Nanita	90	Very limited: Filtering capacity Slope Content of large stones	1.00 1.00 0.08	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.49
29: Nanita	75	Very limited: Filtering capacity Slope Content of large stones	1.00 1.00 1.00	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.86
29: Rock outcrop	15	Not rated.		Not rated.	

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
30: Onahu	35	Very limited: Depth to saturated zone Slope Depth to bedrock	1.00 0.96 0.94	Very limited: Seepage Depth to saturated zone Slope Depth to bedrock	1.00 1.00 1.00 0.84
30: Terric Cryofibrists	25	Very limited: Ponding Depth to saturated zone Restricted permeability	1.00 1.00 0.46	Very limited: Ponding Seepage Depth to saturated zone Slope	1.00 1.00 1.00 0.31
30: Trailridge	20	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Slope Seepage Content of large stones	1.00 1.00 1.00 0.01
31: Peeler	90	Very limited: Restricted permeability Slope	1.00 1.00	Very limited: Slope Seepage	1.00 0.53
32: Rock outcrop	45	Not rated.		Not rated.	

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
32: Cathedral	40	Very limited: Restricted permeability Depth to bedrock Slope	1.00 1.00 1.00	Very limited: Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
33: Rock outcrop	40	Not rated.		Not rated.	
33: Rubble land	30	Not rated.		Not rated.	
34: Rock outcrop	30	Not rated.		Not rated.	
34: Rubble land	30	Not rated.		Not rated.	
34: Enentah	25	Very limited: Slope Content of large stones	1.00 1.00	Very limited: Slope Seepage Content of large stones	1.00 1.00 1.00
35: Rofork	60	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Seepage Slope	1.00 1.00 1.00

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
35: Chasmfalls	30	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Seepage Depth to soft bedrock Slope	1.00 1.00 1.00
36: Rofork	60	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Seepage Slope	1.00 1.00 1.00
36: Isolation	30	Very limited: Filtering capacity Slope Content of large stones	1.00 1.00 0.67	Very limited: Seepage Slope Content of large stones	1.00 1.00 1.00
37: Rubble land	95	Not rated.		Not rated.	
38: Terric Cryofibrists	90	Very limited: Depth to saturated zone Flooding Restricted permeability	1.00 1.00 0.46	Very limited: Seepage Depth to saturated zone Flooding	1.00 1.00 1.00
39: Tileston	85	Very limited: Slope Content of large stones Restricted permeability	1.00 1.00 0.46	Very limited: Slope Seepage Content of large stones	1.00 1.00 1.00

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
40: Tonahutu	85	Very limited: Slope Filtering capacity Restricted permeability	1.00 1.00 0.46	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.06
41: Tonahutu	90	Very limited: Filtering capacity Slope Restricted permeability	1.00 1.00 0.46	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.06
42: Trailridge	40	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Slope Seepage Content of large stones	1.00 1.00 1.00 0.01
42: Archrock	35	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Slope Seepage Depth to soft bedrock Content of large stones	1.00 1.00 1.00 0.02
43: Trailridge	45	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to soft bedrock Slope Seepage Content of large stones	1.00 1.00 1.00 0.01

Table 6.—Sanitary Facilities, Part I --Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
43: Mummy	40	Very limited: Slope	1.00	Very limited: Slope Seepage	1.00 1.00
44: Venable	90	Very limited: Depth to saturated zone Restricted permeability Flooding	1.00 1.00 1.00	Very limited: Seepage Depth to saturated zone Flooding	1.00 1.00 1.00
45: Ypsilon	90	Very limited: Filtering capacity Slope Content of large stones	1.00 1.00 1.00	Very limited: Slope Seepage Content of large stones	1.00 1.00 0.03

Table 7.—Sanitary Facilities, Part II

(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	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Archrock	50	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Seepage Depth to bedrock	1.00 1.00 1.00	Very limited: Slope Depth to bedrock Gravel content Seepage	1.00 1.00 0.70 0.52
1: Fallriver	35	Very limited: Slope Seepage Cobble content	1.00 1.00 0.75	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Content of large stones Seepage Gravel content	1.00 0.64 0.52 0.03
2: Archrock	35	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Seepage Depth to bedrock Slope	1.00 1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 0.70 0.52

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2: Onahu	25	Very limited: Depth to saturated zone Depth to bedrock Slope	1.00 1.00 1.00	Very limited: Depth to saturated zone Seepage Slope Depth to bedrock	1.00 1.00 1.00 0.84	Very limited: Depth to saturated zone Slope Depth to bedrock Seepage Gravel content	1.00 1.00 0.84 0.52 0.26
2: Rock outcrop	20	Not rated.		Not rated.		Not rated.	
3: Bullwark	50	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock Seepage	1.00 1.00 1.00	Very limited: Slope Depth to bedrock Gravel content Seepage Content of large stones	1.00 1.00 0.31 0.22 0.01
3: Catamount	40	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 0.99 0.51

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4: Catamount	90	Very limited: Depth to bedrock Slope	1.00 0.63	Very limited: Depth to bedrock Slope	1.00 0.63	Very limited: Depth to bedrock Gravel content Slope Seepage	1.00 0.99 0.63 0.51
5: Catamount	45	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Gravel content Slope Seepage	1.00 1.00 0.99 0.52
5: Bullwark	30	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage Content of large stones	1.00 1.00 0.31 0.22 0.01
5: Rock outcrop	15	Not rated.		Not rated.		Not rated.	
6: Enentah	85	Very limited: Seepage Cobble content Slope	1.00 1.00 1.00	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Content of large stones Seepage	1.00 1.00 0.52

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7: Enentah	70	Very limited: Slope Seepage Cobble content	1.00 1.00 1.00	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Content of large stones Seepage	1.00 1.00 0.52
7: Rubble land	15	Not rated.		Not rated.		Not rated.	
8: Fallriver	90	Very limited: Seepage Slope Cobble content	1.00 1.00 0.75	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Content of large stones Seepage Gravel content	1.00 1.00 0.52 0.03
9: Fallriver, warm	90	Very limited: Seepage Slope Cobble content	1.00 1.00 0.75	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Content of large stones Seepage Gravel content	1.00 1.00 0.52 0.03

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10: Fallriver	50	Very limited: Seepage Slope Cobble content	1.00 1.00 0.75	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Content of large stones Seepage Gravel content	1.00 0.64 0.52 0.03
10: Hiamovi	30	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.52
11: Fallriver	60	Very limited: Slope Seepage Cobble content	1.00 1.00 0.75	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Content of large stones Seepage Gravel content	1.00 0.64 0.52 0.03
11: Rock outcrop	25	Not rated.		Not rated.		Not rated.	
12: Galuche	55	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 0.97 0.52

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
12: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
13: Granile	85	Very limited: Slope	1.00	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Gravel content	1.00 0.97
14: Hiamovi	55	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Gravel content Slope Seepage	1.00 1.00 1.00 0.51
14: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
15: Hiamovi	50	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.51
15: Rock outcrop	30	Not rated.		Not rated.		Not rated.	

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
16: Isolation	90	Very limited: Seepage Slope Too sandy Cobble content	1.00 1.00 0.50 0.05	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Seepage Too sandy Gravel content Content of large stones	1.00 0.52 0.50 0.26 0.19
17: Kawuneeche	90	Very limited: Depth to saturated zone Seepage Too sandy Flooding	1.00 1.00 1.00 1.00	Very limited: Depth to saturated zone Seepage Flooding	1.00 1.00 1.00	Very limited: Too sandy Seepage Depth to saturated zone Gravel content	1.00 1.00 1.00 0.84
18: Kawuneeche	90	Very limited: Depth to saturated zone Seepage Flooding Too sandy	1.00 1.00 1.00 0.50	Very limited: Depth to saturated zone Seepage Flooding	1.00 1.00 1.00	Very limited: Seepage Depth to saturated zone Too sandy Gravel content	1.00 1.00 0.50 0.08
19: Kawuneeche, low precipitation	90	Very limited: Depth to saturated zone Seepage Flooding Too sandy	1.00 1.00 1.00 0.50	Very limited: Depth to saturated zone Seepage Flooding	1.00 1.00 1.00	Very limited: Seepage Depth to saturated zone Too sandy Gravel content	1.00 1.00 0.50 0.07

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
20: Kawuneeche	50	Very limited: Depth to saturated zone Seepage Flooding Too sandy	1.00 1.00 1.00 0.50	Very limited: Depth to saturated zone Seepage Flooding	1.00 1.00 1.00	Very limited: Seepage Depth to saturated zone Too sandy Gravel content	1.00 1.00 0.50 0.08
20: Dystrocryepts	40	Very limited: Depth to saturated zone Seepage Flooding Slope	1.00 1.00 0.40 0.16	Very limited: Seepage Depth to saturated zone Flooding Slope	1.00 1.00 0.40 0.16	Somewhat limited: Seepage Slope Depth to saturated zone Gravel content	0.52 0.16 0.09 0.03
21: Legault	90	Very limited: Slope Depth to bedrock Too sandy	1.00 1.00 0.50	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Seepage Gravel content Too sandy	1.00 1.00 1.00 1.00 0.50
22: Lumpyridge	90	Very limited: Seepage Too sandy	1.00 0.50	Very limited: Seepage	1.00	Very limited: Seepage Gravel content Too sandy	1.00 0.71 0.50

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
23: Lumpyridge	60	Very limited: Seepage Too sandy Slope	1.00 0.50 0.04	Very limited: Seepage Slope	1.00 0.04	Very limited: Seepage Gravel content Too sandy Slope	1.00 0.76 0.50 0.04
23: Rofork	25	Very limited: Depth to bedrock Too sandy Slope	1.00 0.50 0.16	Very limited: Depth to bedrock Slope	1.00 0.16	Very limited: Depth to bedrock Seepage Gravel content Too sandy Slope	1.00 1.00 1.00 0.50 0.16
24: Mummy	85	Very limited: Slope Seepage Cobble content	1.00 1.00 1.00	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Content of large stones Seepage	1.00 1.00 0.52
25: Mummy	85	Very limited: Seepage Slope	1.00 1.00	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Gravel content Seepage	1.00 0.89 0.52

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
26: Nanita	85	Very limited: Slope Seepage Too sandy Cobble content	1.00 1.00 0.50 0.04	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Seepage Gravel content Too sandy Content of large stones	1.00 1.00 1.00 0.50 0.17
27: Nanita	100	Very limited: Seepage Too sandy Cobble content	1.00 1.00 1.00	Very limited: Seepage	1.00	Very limited: Too sandy Seepage Content of large stones	1.00 1.00 1.00
28: Nanita	90	Very limited: Seepage Too sandy Slope Cobble content	1.00 1.00 1.00 0.02	Very limited: Seepage Slope	1.00 1.00	Very limited: Too sandy Slope Gravel content Seepage Content of large stones	1.00 1.00 1.00 1.00 0.12
29: Nanita	75	Very limited: Seepage Too sandy Cobble content Slope	1.00 1.00 1.00 1.00	Very limited: Seepage Slope	1.00 1.00	Very limited: Too sandy Slope Content of large stones Seepage	1.00 1.00 1.00 0.52

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
29: Rock outcrop	15	Not rated.		Not rated.		Not rated.	
30: Onahu	35	Very limited: Depth to saturated zone Depth to bedrock Slope	1.00 1.00 0.96	Very limited: Depth to saturated zone Seepage Slope Depth to bedrock	1.00 1.00 0.96 0.84	Very limited: Depth to saturated zone Slope Depth to bedrock Seepage Gravel content	1.00 0.96 0.84 0.52 0.26
30: Terric Cryofibrists	25	Very limited: Depth to saturated zone Ponding Seepage Too sandy	1.00 1.00 1.00 0.50	Very limited: Ponding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited: Ponding Depth to saturated zone Seepage Too sandy	1.00 1.00 0.52 0.50
30: Trailridge	20	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.52
31: Peeler	90	Very limited: Slope	1.00	Very limited: Slope	1.00	Very limited: Slope	1.00

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
32: Rock outcrop	45	Not rated.		Not rated.		Not rated.	
32: Cathedral	40	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.52
33: Rock outcrop	40	Not rated.		Not rated.		Not rated.	
33: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Rock outcrop	30	Not rated.		Not rated.		Not rated.	
34: Rubble land	30	Not rated.		Not rated.		Not rated.	
34: Enentah	25	Very limited: Slope Seepage Cobble content	1.00 1.00 1.00	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Content of large stones Seepage	1.00 1.00 0.52

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35: Rofork	60	Very limited: Depth to bedrock Slope Too sandy	1.00 1.00 0.50	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Seepage Gravel content Slope Too sandy	1.00 1.00 1.00 1.00 0.50
35: Chasmfalls	30	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Seepage Depth to bedrock Slope	1.00 1.00 1.00	Very limited: Depth to bedrock Slope Seepage Gravel content	1.00 1.00 0.52 0.24
36: Rofork	60	Very limited: Depth to bedrock Slope Too sandy	1.00 1.00 0.50	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Seepage Gravel content Slope Too sandy	1.00 1.00 1.00 1.00 0.50
36: Isolation	30	Very limited: Seepage Slope Too sandy Cobble content	1.00 1.00 0.50 0.06	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Seepage Too sandy Gravel content Content of large stones	1.00 0.52 0.50 0.25 0.21

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
37: Rubble land	95	Not rated.		Not rated.		Not rated.	
38: Terric Cryofibrists	90	Very limited: Depth to saturated zone Seepage Flooding Too sandy	1.00 1.00 1.00 0.50	Very limited: Depth to saturated zone Seepage Flooding	1.00 1.00 1.00	Very limited: Depth to saturated zone Too sandy Seepage	1.00 0.50 0.22
39: Tileston	85	Very limited: Seepage Cobble content Slope	1.00 1.00 1.00	Very limited: Seepage Slope	1.00 1.00	Very limited: Slope Content of large stones Seepage	1.00 1.00 0.52
40: Tonahutu	85	Very limited: Slope Seepage Too sandy	1.00 1.00 0.50	Very limited: Slope	1.00	Very limited: Slope Seepage Gravel content Too sandy	1.00 1.00 0.90 0.50
41: Tonahutu	90	Very limited: Slope Seepage Too sandy	1.00 1.00 0.50	Very limited: Slope	1.00	Very limited: Slope Seepage Gravel content Too sandy	1.00 1.00 0.90 0.50

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
42: Trailridge	40	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Depth to bedrock Gravel content Slope Seepage	1.00 1.00 1.00 0.52
42: Archrock	35	Very limited: Depth to bedrock Slope	1.00 1.00	Very limited: Seepage Depth to bedrock Slope	1.00 1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 0.70 0.52
43: Trailridge	45	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Slope Depth to bedrock	1.00 1.00	Very limited: Depth to bedrock Slope Gravel content Seepage	1.00 1.00 1.00 0.52
43: Mummy	40	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Gravel content Seepage	1.00 0.89 0.52
44: Venable	90	Very limited: Depth to saturated zone Flooding Clayey	1.00 1.00 0.50	Very limited: Depth to saturated zone Seepage Flooding	1.00 1.00 1.00	Very limited: Depth to saturated zone	1.00

Table 7.—Sanitary Facilities, Part II--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
45: Ypsilon	90	Very limited: Slope Seepage Cobble content Too sandy	1.00 1.00 1.00 0.50	Very limited: Slope Seepage	1.00 1.00	Very limited: Slope Seepage Content of large stones Too sandy	1.00 1.00 1.00 0.50

Table 8.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
1: Archrock	0-8	Gravelly loam	SC-SM, SM, GM, GC-GM	A-4	0-10	5-25	65-80	60-75	50-65	35-50	20-25	NP-5
	8-18	Very gravelly loam, very gravelly sandy loam	GM, GC-GM	A-2, A-1	0-15	5-25	35-55	25-50	25-50	20-40	20-25	NP-5
	18-25	Very gravelly coarse sandy loam, very gravelly sandy loam	GM, GW-GM, GC-GM	A-1	0-15	0-25	35-55	15-35	15-35	5-20	20-25	NP-5
	25-35	Weathered bedrock			---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plasticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
1: Fallriver	0-2	Moderately decomposed plant material			---	---	---	---	---	---	---	---
	2-9	Gravelly sandy loam	GM, GC-GM, SC-SM	A-2, A-1	0-15	0-25	60-80	55-75	35-50	20-30	20-25	NP-5
	9-21	Very cobbly sandy loam, very cobbly coarse sandy loam	GC-GM, SM, GM	A-1, A-2	0-25	25-60	45-85	40-80	20-50	10-30	20-25	NP-5
	21-35	Very cobbly sandy loam, very cobbly coarse sandy loam	GC-GM, GM, SM	A-1, A-2	0-25	25-70	45-85	40-80	20-50	10-30	20-25	NP-5
	35-63	Very gravelly coarse sandy loam, very gravelly loamy coarse sand	GC-GM, GW-GM, GW	A-1	0-25	15-25	35-55	30-50	15-35	0-15	20-25	NP-5
2: Archrock	0-8	Gravelly loam	SC-SM, GM, SM, GC-GM	A-4	0-10	5-25	65-80	60-75	50-65	35-50	20-25	NP-5
	8-18	Very gravelly loam	GM, GC-GM	A-2, A-1	0-15	5-25	35-55	30-50	25-50	20-40	20-25	NP-5
	18-25	Very gravelly coarse sandy loam, very gravelly sandy loam	GM, GW-GM, GC-GM	A-1	0-15	0-25	35-55	30-50	15-35	5-20	20-25	NP-5
	25-35	Weathered bedrock			---	---	---	--	---	---	---	---

Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

[illegible]

Table 8.--Engineering Index Properties--Continued

[illegible]

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
5: Bullwark	0-2	Slightly decomposed plant material			---	---	---	---	---	---	---	---
	2-9	Very gravelly coarse sandy loam	GW-GM, GC-GM, GM	A-1	0-10	0-25	35-55	30-50	15-35	5-20	20-25	NP-5
	9-15	Very gravelly sandy loam, very gravelly coarse sandy loam	GW-GC, GC, GC-GM	A-1, A-2	0-10	0-25	35-55	30-50	15-35	5-20	25-30	5-10
	15-23	Very cobbly sandy loam, very cobbly sandy clay loam	GC-GM, GC	A-1, A-2, A-4	0-10	20-70	45-90	40-85	25-75	15-45	25-30	5-10
	23-32 32-60	Weathered bedrock Unweathered bedrock			---	---	---	---	---	---	---	---
5: Rock outcrop	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
6: Entenah	0-6	Very stony loam	GC, GC-GM, SC-SM, SC	A-4, A-2	25-65	15-50	45-90	40-85	35-80	25-65	25-30	5-10
	6-20	Very cobbly loam, very cobbly sandy loam	GC-GM, GM, SC-SM, SM	A-4, A-2, A-1	0-25	25-60	45-90	40-85	25-80	15-65	20-25	NP-5
	20-34	Extremely cobbly loam, extremely cobbly sandy loam	GM, SM, SC-SM, GC-GM	A-3, A-4, A-2, A-1	0-30	30-80	20-80	15-75	10-70	5-55	20-25	NP-5
	34-56	Extremely cobbly sandy loam, extremely cobbly coarse sandy loam	GM, GC-GM, GP-GM	A-2, A-1	0-30	30-85	20-80	15-75	10-50	5-30	20-25	NP-5
	56-72	Extremely cobbly sandy loam, extremely cobbly loamy sand	GC-GM, GP-GM, GM	A-2, A-3, A-1	0-30	30-85	20-80	15-75	10-55	5-30	20-25	NP-5

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
7: Enentah	0-6	Very stony loam	GC, SC-SM, GC-GM, SC	A-4, A-2	25-65	15-50	45-90	40-85	35-80	25-65	25-30	5-10
	6-20	Very cobbly loam, very cobbly sandy loam	GC-GM, SC-SM, GM, SM	A-2, A-4, A-1	0-25	25-60	45-90	40-85	25-80	15-65	20-25	NP-5
	20-34	Extremely cobbly loam, extremely cobbly sandy loam	SC-SM, GC-GM, SM, GM	A-3, A-4, A-2, A-1	0-30	30-80	20-80	15-75	10-70	5-55	20-25	NP-5
	34-56	Extremely cobbly sandy loam, extremely cobbly coarse sandy loam	GP-GM, GM, GC-GM	A-2, A-1	0-30	30-85	20-80	15-75	10-50	5-30	20-25	NP-5
	56-72	Extremely cobbly sandy loam, extremely cobbly loamy sand	GC-GM, GP-GM, GM	A-3, A-2, A-1	0-30	30-85	20-80	15-75	10-55	5-30	20-25	NP-5
7: Rubble land	0-60	Cobbles, stones	GW	A-1	30-80	20-65	0-10	0-5	0-5	0	---	---

Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
11: Fallriver	0-2	Moderately decomposed plant material			---	---	---	---	---	---	---	---
	2-9	Gravelly sandy loam	GM, GC-GM, SC-SM	A-1, A-2	0-15	0-25	60-80	55-75	35-50	20-30	20-25	NP-5
	9-21	Very cobbly sandy loam, very cobbly coarse sandy loam	GC-GM, GM, SM	A-1, A-2	0-25	25-60	45-85	40-80	20-50	10-30	20-25	NP-5
	21-35	Very cobbly sandy loam, very cobbly coarse sandy loam	GC-GM, SM, GM	A-1, A-2	0-25	25-70	45-85	40-80	20-50	10-30	20-25	NP-5
	35-63	Very gravelly coarse sandy loam, very gravelly loamy coarse sand	GC-GM, GW, GW-GM	A-1	0-25	15-25	35-55	30-50	15-35	0-15	20-25	NP-5
11: Rock outcrop	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
12: Galuche	0-1	Moderately decomposed plant material			---	---	---	---	---	---	---	---
	1-3	Very gravelly sandy loam	GC-GM, SC-SM, GC, GW-GC	A-1, A-2	0-10	0-25	35-55	30-50	15-35	5-20	25-30	5-10
	3-9	Very gravelly sandy loam, very gravelly coarse sandy loam	GW-GM, GC-GM, GM	A-1	0-10	0-25	35-55	30-50	15-35	5-20	20-25	NP-5
	9-19	Very gravelly sandy loam, very gravelly coarse sandy loam	GM, GC-GM, GW-GM	A-1	0-10	0-25	35-55	30-50	15-35	5-20	20-25	NP-5
	19-60	Unweathered bedrock			----	----	----	----	----	----	----	----
12: Rock outcrop	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
14: Rock outcrop	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
15: Hiamovi	0-5	Extremely gravelly sandy loam	GW-GM	A-1	0-20	0-25	15-30	10-25	5-20	5-10	20-25	NP-5
	5-13	Extremely gravelly sandy loam,	GW-GM	A-1	0-20	0-25	15-30	10-25	5-20	5-10	20-25	NP-5
	13-60	extremely gravelly coarse sandy loam Unweathered bedrock			---	---	---	---	---	---	---	---
15: Rock outcrop	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
16: Isolation	0-1	Slightly decomposed plant material			---	---	---	---	---	---	---	---
	1-6	Gravelly sandy loam	GM, SC-SM, GC-GM, SM	A-1-b, A- 2-4	0-10	0-15	60-80	55-75	35-50	20-30	20-25	NP-5
	6-11	Very gravelly sandy loam	GW-GM, GC-GM, GM	A-1	0-25	0-25	35-55	30-50	20-35	10-20	20-25	NP-5
	11-24	Extremely cobbly sandy loam, extremely cobbly coarse sandy loam	GC, GC-GM, GP-GC	A-1	0-30	30-70	20-80	15-75	10-55	0-30	25-30	5-10
	24-33	Extremely gravelly sandy loam, extremely cobbly sandy loam	GW, GC, GW-GC	A-1	0-30	0-35	15-50	10-45	5-30	0-20	25-30	5-10
	33-39	Extremely gravelly coarse sand, extremely gravelly loamy coarse sand	GW	A-1	0-30	0-35	15-30	10-25	5-15	0-5	0-0	NP
	39-51	Very gravelly coarse sand, very gravelly sand	GW		0-25	0-25	35-55	30-50	15-30	0-5	0-0	NP
	51-72	Loamy coarse sand, coarse sand	SM, SW-SM, SP-SM	A-1-b, A- 2-4	0-10	0-10	85-100	80-100	35-70	10-25	0-0	NP

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plasticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
17: Kawuneeche	0-6	Loam	CL-ML, CL	A-4	0	0	85-100	80-100	70-95	50-75	25-30	5-10
	6-12	Loam	CL, CL-ML	A-4	0	0	85-100	80-100	70-95	50-75	25-30	5-10
	12-20	Gravelly sandy loam	SC-SM, SM, GC-GM	A-1	0	0-5	65-80	60-75	35-50	20-30	20-25	NP-5
	20-35	Gravelly loamy fine sand, gravelly sandy loam	SM, SC-SM	A-1	0	0-5	60-80	55-75	30-55	10-35	0-0	NP
	35-61	Extremely gravelly coarse sand	GW	A-1	0-3	0-30	15-30	10-25	5-15	0-5	0-0	NP
18: Kawuneeche	0-5	Mucky peat	PT	A-8	0	0	---	---	---	---	---	---
	5-12	Clay loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	70-100	50-80	25-35	5-15
	12-23	Loam, silt loam	CL-ML, ML	A-4	0	0	85-100	80-100	70-100	50-90	20-25	NP-5
	23-31	Coarse sandy loam, sandy loam	SM, SC-SM	A-4, A-2, A-1	0	0	80-100	75-90	45-70	20-40	20-25	NP-5
	31-66	Very gravelly loamy sand, very gravelly sand	GM, GW, GW-GM	A-1	0-5	0-25	35-55	30-50	20-40	0-15	0-0	NP

Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

[illegible]

Table 8.--Engineering Index Properties--Continued

[illegible]

[illegible]

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
30: Trailridge	0-6	Extremely gravelly sandy loam	GW-GM, GC-GM, GM	A-1	0-20	0-25	25-40	20-35	10-20	5-15	20-25	NP-5
	6-11	Extremely gravelly sandy loam	GW-GM, GC-GM, GM	A-1	0-20	0-25	25-40	20-30	10-20	5-15	20-25	NP-5
	11-19	Extremely gravelly coarse sandy loam, extremely gravelly sandy loam	GC-GM, GW-GM, GM	A-1	0-20	0-25	25-35	20-30	10-20	5-15	20-25	NP-5
	19-29	Weathered bedrock			---	---	---	---	---	---	---	---
31: Peeler	0-2	Moderately decomposed plant material			---	---	---	---	---	---	---	---
	2-10	Loam	CL-ML, CL	A-4	0	0-15	100	100	85-95	60-75	25-30	5-10
	10-22	Sandy clay loam, loam	SC, CL-ML, SC-SM	A-4, A-2	0	0-15	85-100	80-100	65-90	30-55	25-30	5-10
	22-40	Sandy clay loam, clay loam	SC-SM, CL-ML, SC	A-4, A-2	0	0-15	85-100	80-100	65-100	30-80	25-30	5-10
	40-62	Gravelly sandy clay loam, gravelly sandy clay	GC-GM, SC-SM, GC, SC	A-4, A-2, A-1	0	0-15	60-80	55-75	35-70	20-40	25-30	5-10

Table 8.--Engineering Index Properties--Continued

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Table 8.--Engineering Index Properties--Continued

[illegible]

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
36: Isolation	0-1	Slightly decomposed plant material			---	---	---	---	---	---	---	---
	1-6	Gravelly sandy loam	SM, GC-GM, SC-SM GM	A-1-b, A-2-4	0-10	0-15	60-80	55-75	35-50	20-30	20-25	NP-5
	6-11	Very gravelly sandy loam	GW-GM, GC-GM, GM	A-1	0-25	0-25	35-55	30-50	20-35	10-20	20-25	NP-5
	11-24	Extremely cobbly sandy loam, extremely cobbly coarse sandy loam	GC-GM, GC, GP-GC	A-1	0-30	30-70	20-80	15-75	10-55	0-30	25-30	5-10
	24-33	Extremely gravelly sandy loam, extremely cobbly sandy loam	GW, GW-GC, GC	A-1	0-30	0-35	15-50	10-45	5-30	0-20	25-30	5-10
	33-39	Extremely gravelly coarse sand, extremely gravelly loamy coarse sand	GW	A-1	0-30	0-35	15-30	10-25	5-15	0-5	0-0	NP
	39-51	Very gravelly coarse sand, very gravelly sand	GW		0-25	0-25	35-55	30-50	15-30	0-5	0-0	NP
	51-72	Loamy coarse sand, coarse sand	SW-SM, SM, SP-SM	A-1-b, A-2-4	0-10	0-10	85-100	80-100	35-70	10-25	0-0	NP

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
37: Rubble land	0-60	Cobbles, stones	GW	A-1	30-80	20-65	0-10	0-5	0-5	0	---	---
38: Terric Cryofibrists	0-19 19-21 21-32 32-53 53-60	Peat Muck Loam, fine sandy loam Stratified loamy sand to loam Very gravelly sandy loam, very gravelly loamy sand	PT PT CL-ML, CL SC-SM, SC, ML, SM, CL-ML GC-GM, GW-GM, GM	A-8 A-8 A-4 A-1, A-2, A-4 A-1	0 0 0 0 0-10	0 0 0-25 0-25 0-25	--- --- 85-100 85-100 35-55	--- --- 80-100 80-100 30-50	--- --- 70-95 40-95 20-40	--- --- 50-75 15-75 10-20	--- --- 25-30 20-30 20-25	--- --- 5-10 NP- 10 NP-5

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
39: Tileston	0-3	Moderately decomposed plant material			0-10	0-15	---	---	---	---	---	---
	3-7	Very cobbly sandy loam	GM, SC-SM, GC-GM	A-2, A-1	0-25	25-65	45-90	40-85	25-60	15-35	20-25	NP-5
	7-13	Very gravelly sandy loam, very gravelly sandy clay loam	GC-GM, GC, GW-GC	A-1, A-2	0-25	0-25	35-55	30-50	20-45	10-30	25-30	5-10
	13-28	Extremely cobbly sandy clay loam, extremely cobbly sandy loam	GC, GC-GM, SC-SM	A-2, A-2, A-4	0-25	30-85	20-80	15-75	10-70	5-40	25-30	5-10
	28-36	Extremely cobbly sandy clay loam, extremely cobbly sandy loam	GC, SC-SM, GC-GM	A-4, A-2	0-25	30-75	20-80	15-75	10-70	5-40	25-30	5-10
	36-64	Extremely cobbly sandy loam, extremely cobbly coarse sandy loam, extremely cobbly loamy coarse sand	GC-GM, GP-GM, GP	A-2, A-1	0-30	30-85	20-80	15-75	5-50	0-30	20-25	NP- 10

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
40: Tonahutu	0-1	Moderately decomposed plant material			---	---	---	---	---	---	---	---
	1-6	Very gravelly sandy loam	GC-GM, GM	A-1	0-20	0-25	35-55	30-50	20-35	10-20	20-25	NP-5
	6-21	Very gravelly sandy loam, very gravelly sandy clay loam, very gravelly coarse sandy loam	GC-GM, GC	A-2, A-1	0-25	0-25	35-55	30-50	20-50	10-30	20-30	NP- 10
	21-35	Very gravelly sandy loam, very gravelly sandy clay loam, very gravelly coarse sandy loam	GC-GM, GC	A-2, A-1	0-25	0-25	35-55	30-50	20-50	10-30	20-30	NP- 10
	35-45	Very gravelly sandy clay loam, very gravelly sandy loam, very gravelly coarse sandy loam	GC-GM, GC	A-2, A-1	0-25	0-30	35-55	30-50	20-50	10-30	20-30	NP- 10
	45-62	Very gravelly loamy sand, very gravelly sandy loam	GC-GM, GM	A-1	0-25	0-30	35-55	30-50	20-50	10-15	20-25	NP-5

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plas- ticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
41: Tonahutu	0-1	Moderately decomposed plant material			---	---	---	---	---	---	---	---
	1-6	Very gravelly sandy loam	GC-GM, GM	A-1	0-20	0-25	35-55	30-50	20-35	10-20	20-25	NP-5
	6-21	Very gravelly sandy loam, very gravelly sandy clay loam, very gravelly coarse sandy loam	GC-GM, GC	A-2, A-1	0-25	0-25	35-55	30-50	20-50	10-30	20-30	NP-10
	21-35	Very gravelly sandy loam, very gravelly sandy clay loam, very gravelly coarse sandy loam	GC-GM, GC	A-2, A-1	0-25	0-25	35-55	30-50	20-50	10-30	20-30	NP-10
	35-45	Very gravelly sandy clay loam, very gravelly sandy loam, very gravelly coarse sandy loam	GC GC-GM.	A-2, A-1	0-25	0-30	35-55	30-50	20-50	10-30	20-30	NP-10
	45-62	Very gravelly loamy sand, very gravelly sandy loam	GC-GM, GM	A-1	0-25	0-30	35-55	30-50	20-50	10-15	20-25	NP-5

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plasticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
42: Trailridge	0-6	Extremely gravelly sandy loam	GM, GW-GM, GC-GM	A-1	0-20	0-25	25-40	20-35	10-20	5-15	20-25	NP-5
	6-11	Extremely gravelly sandy loam	GC-GM, GM, GW-GM	A-1	0-20	0-25	25-40	20-35	10-20	5-15	20-25	NP-5
	11-19	Extremely gravelly coarse sandy loam, extremely gravelly sandy loam	GC-GM, GM, GW-GM,	A-1	0-20	0-25	25-35	20-30	10-20	5-15	20-25	NP-5
	19-29	Weathered bedrock			---	---	---	---	---	---	---	---
42: Archrock	0-8	Gravelly loam	GM, SM, GC-GM, SC-SM, GM, GC-GM	A-4	0-10	5-25	65-80	60-75	50-65	35-50	20-25	NP-5
	8-18	Very gravelly loam, very gravelly sandy loam	GM, GC-GM	A-2, A-1	0-15	5-25	35-55	30-50	25-50	20-40	20-25	NP-5
	18-25	Very gravelly coarse sandy loam, very gravelly sandy loam	GW-GM, GC-GM, GM	A-1	0-15	0-25	35-55	30-50	15-35	5-20	20-25	NP-5
	25-35	Weathered bedrock			---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plasticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
43: Trailridge	0-6	Extremely gravelly sandy loam			0-20	0-25	15-30	10-25	5-20	5-10	20-25	NP-5
	6-11	Extremely gravelly sandy loam			0-20	0-25	15-30	10-25	5-20	5-10	20-25	NP-5
	11-19	Extremely gravelly coarse sandy loam, extremely gravelly sandy loam			0-20	0-25	15-30	10-25	5-20	5-10	20-25	NP-5
	19-29	Weathered bedrock			---	---	---	---	---	---	---	---
43: Mummy	0-10	Gravelly sandy loam	GC-GM, SC-SM	A-4	0-10	0-10	60-80	55-75	50-70	35-55	25-30	5-10
	10-21	Very gravelly sandy loam, very gravelly loam	GW-GC, GC-GM, GC	A-2, A-4, A-1	0-10	0-25	35-55	30-50	20-50	10-40	25-30	5-10
	21-63	Very gravelly sandy loam, very gravelly loam	GM, GC-GM, GW-GM	A-4, A-2, A-1	0-25	0-25	35-55	30-50	15-50	5-40	20-25	NP-5

Table 8.--Engineering Index Properties--Continued

Map symbol and soil name	Depth (in.)	USDA Texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit (pct.)	Plasticity index
			Unified	AASHTO	>10 inches (pct.)	3-10 inches (pct.)	4	10	40	200		
44: Venable	0-3	Moderately decomposed plant material			---	---	---	---	---	---	---	---
	3-9	Loam	CL-ML, CL	A-4	0	0-5	85-100	80-100	70-95	50-75	25-30	5-10
	9-14	Loam	CL, CL-ML		0-5	0-10	85-100	80-100	70-95	50-75	25-30	5-10
	14-31	Sandy clay loam, loam	CL, CL-ML, SC-SM, SC	A-2-4, A-4	0-5	0-10	85-100	80-100	65-90	30-60	25-30	5-10
	31-43	Gravelly loamy coarse sand, gravelly coarse sandy loam	SW-SM, SM, SC-SM	A-1-b	0-5	0-15	60-90	55-75	25-50	10-20	20-25	NP-5
	43-63	Very cobbly loam, very cobbly silty clay loam, very cobbly clay loam	CL, SC, GC	A-2-6, A-6	0-5	20-35	45-90	40-85	40-80	25-75	30-35	10-15

Table 8.--Engineering Index Properties--Continued

[illegible]

Table 9.--Physical Properties of the Soils

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

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
1: Archrock	0-8 8-18 18-25 25-35	10-18 10-18 5-18 ---	1.25-1.35 1.25-1.35 1.35-1.45 ---	2-6 2-6 2-6 0.00-0.2	0.10-0.13 0.07-0.09 0.05-0.07 ---	0.0-2.9 0.0-1.6 0.0-1.0 ---	1.0-5.0 0.5-2.0 0.0-2.0 ---	.15 .15 .10 ---	.24 .37 .24 ---	2	5	56
1: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 8-18 8-18 8-18 5-15	--- 1.35-1.45 1.35-1.45 1.35-1.45 1.35-1.55	2-6 2-6 2-6 2.6 2.6	--- 0.07-0.10 0.05-0.07 0.05-0.07 0.03-0.06	--- 0.0-2.9 0.0-1.6 0.0-1.6 0.0-1.0	--- 0.5-1.0 0.5-2.0 0.5-1.0 0.0-0.5	--- .15 .10 .10 .10	--- .28 .24 .24 .20	3	3	86
2: Archrock	0-8 8-18 18-25 25-35	10-18 10-18 5-18 ---	1.25-1.35 1.25-1.35 1.35-1.45 ---	2-6 2-6 2-6 0.00-0.2	0.10-0.13 0.07-0.09 0.05-0.07 ---	0.0-2.9 0.0-1.6 0.0-1.0 ---	1.0-5.0 0.5-2.0 0.0-2.0 ---	.15 .15 .10 ---	.24 .37 .24 ---	2	5	56
2: Onahu	0-7 7-16 16-24 24-45 45-55	10-18 10-18 8-18 5-18 ---	1.25-1.35 1.25-1.45 1.25-1.45 1.35-1.45 ---	0.6-2 2-6 2-6 2-6 0.00-0.2	0.13-0.16 0.09-0.15 0.05-0.09 0.05-0.07 ---	0.0-2.9 0.0-2.9 0.0-1.6 0.0-1.6 ---	3.0-5.0 1.0-5.0 0.0-1.0 0.0-1.0 ---	.20 .24 .15 .10 ---	.20 .24 .32 .28 ---	3	5	56
2: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
3: Bullwark	0-2 2-9 9-15 15-23 23-32 32-60	--- 8-18 10-27 10-27 --- ---	--- 1.45-1.55 1.55-1.65 1.55-1.75 --- ---	2-6 2-6 2-6 0.6-6 0.00-0.2 0.00-0.06	--- 0.05-0.07 0.05-0.07 0.05-0.09 --- ---	--- 0.0-0.1 0.0-1.6 0.0-1.6 --- ---	--- 0.5-1.5 0.0-1.0 0.0-1.0 --- ---	--- .10 .10 .10 --- ---	--- .28 .28 .24 --- ---	3	8	0
3: Catamount	0-1 1-3 3-10 10-14 14-24	--- 5-18 5-18 5-18 ---	--- 1.35-1.45 1.35-1.45 1.35-1.45 ---	--- 2-6 2-6 2-6 0.00-0.2	--- 0.07-0.09 0.05-0.06 0.05-0.06 ---	--- 0.0-2.0 0.0-1.0 0.0-1.0 ---	--- 0.5-2.0 0.0-0.5 0.0-0.5 ---	--- .15 .10 .10 ---	--- .24 .28 .28 ---	2	3	86
4: Catamount	0-1 1-3 3-10 10-14 14-24	--- 5-18 5-18 5-18 ---	--- 1.35-1.45 1.35-1.45 1.35-1.45 ---	--- 2-6 2-6 2-6 0.00-0.2	--- 0.07-0.09 0.05-0.06 0.05-0.06 ---	--- 0.0-2.0 0.0-1.0 0.0-1.0 ---	--- 0.5-2.0 0.0-0.5 0.0-0.5 ---	--- .15 .10 .10 ---	--- .24 .28 .28 ---	2	3	86
5: Catamount	0-1 1-3 3-10 10-14 14-24	--- 5-18 5-18 5-18 ---	--- 1.35-1.45 1.35-1.45 1.35-1.45 ---	--- 2-6 2-6 2-6 0.00-0.2	--- 0.07-0.09 0.05-0.06 0.05-0.06 ---	--- 0.0-2.0 0.0-1.0 0.0-1.0 ---	--- 0.5-2.0 0.0-0.5 0.0-0.5 ---	--- .15 .10 .10 ---	--- .24 .28 .28 ---	2	3	86

[illegible]

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
8: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 8-18 8-18 8-18 5-15	--- 1.35-1.45 1.35-1.45 1.35-1.45 1.35-1.45	2-6 2-6 2-6 2-6 2-6	--- 0.07-0.10 0.05-0.07 0.05-0.07 0.03-0.06	--- 0.0-2.9 0.0-1.6 0.0-1.6 0.0-1.0	--- 0.5-1.0 0.5-2.0 0.5-1.0 0.0-0.5	--- .15 .10 .10 .10	--- .28 .24 .24 .20	3	3	86
9: Fallriver, warm	0-2 2-9 9-21 21-35 35-63	--- 8-18 8-18 8-18 5-15	--- 1.35-1.45 1.35-1.45 1.35-1.45 1.35-1.45	2-6 2-6 2-6 2-6 2-6	--- 0.07-0.10 0.05-0.07 0.05-0.07 0.03-0.06	--- 0.0-2.9 0.0-1.6 0.0-1.6 0.0-1.0	--- 0.5-1.0 0.5-2.0 0.5-1.0 0.0-0.5	--- .15 .10 .10 .10	--- .28 .24 .24 .20	3	3	86
10: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 8-18 8-18 8-18 5-15	--- 1.35-1.45 1.35-1.45 1.35-1.45 1.35-1.45	2-6 2-6 2-6 2-6 2-6	--- 0.07-0.10 0.05-0.07 0.05-0.07 0.03-0.06	--- 0.0-2.9 0.0-1.6 0.0-1.6 0.0-1.0	--- 0.5-1.0 0.5-2.0 0.5-1.0 0.0-0.5	--- .15 .10 .10 .10	--- .28 .24 .24 .20	3	3	86
10: Hiamovi	0-5 5-13 13-60	8-18 8-18 ---	1.35-1.45 1.35-1.45 ---	2-6 2-6 0.00-0.06	0.03-0.04 0.03-0.04 ---	0.0-1.0 0.0-1.0 ---	0.5-2.0 0.0-0.5 ---	.05 .05 ---	.28 .24 ---	1	8	0
11: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 8-18 8-18 8-18 5-15	--- 1.35-1.45 1.35-1.45 1.35-1.45 1.35-1.45	2-6 2-6 2-6 2-6 2-6	--- 0.07-0.10 0.05-0.07 0.05-0.07 0.03-0.06	--- 0.0-2.9 0.0-1.6 0.0-1.6 0.0-1.0	--- 0.5-1.0 0.5-2.0 0.5-1.0 0.0-0.5	--- .15 .10 .10 .10	--- .28 .24 .24 .20	3	3	86

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
11: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0
12: Galuche	0-1 1-3 3-9 9-19 19-60	--- 10-20 8-18 8-18 ---	--- 1.35-1.50 1.35-1.50 1.35-1.50 ---	2-6 2-6 2-6 2-6 0.00-0.06	--- 0.05-0.07 0.05-0.07 0.05-0.07 ---	--- 0.0-1.6 0.0-1.6 0.0-1.6 ---	--- 1.0-3.0 0.5-1.0 0.0-1.0 ---	--- .10 .10 .10 ---	--- .24 .28 .28 ---	1	8	0
12: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0
13: Granile	0-3 3-8 8-21 21-43 43-65	--- 8-18 10-18 20-35 15-27	--- 1.35-1.45 1.25-1.45 1.25-1.35 1.25-1.45	2-6 2-6 2-6 0.6-2 0.6-2	--- 0.05-0.07 0.05-0.07 0.07-0.11 0.05-0.09	--- 0.0-1.0 0.0-0.8 1.0-2.0 1.0-3.0	--- 0.5-1.0 0.5-1.0 0.5-1.0 0.0-0.5	--- .10 .05 .05 .10	--- .24 .28 .20 .28	3	8	0
14: Hiamovi	0-5 5-13 13-60	8-18 8-18 ---	1.35-1.45 1.35-1.45 ---	2-6 2-6 0.00-0.06	0.03-0.04 0.03-0.04 ---	0.0-1.0 0.0-1.0 ---	0.5-2.0 0.0-0.5 ---	.05 .05 ---	.28 .24 ---	1	8	0
14: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
15: Hiamovi	0-5 5-13 13-60	8-18 8-18 ---	1.35-1.45 1.35-1.45 ---	2-6 2-6 0.00-0.06	0.03-0.04 0.03-0.04 ---	0.0-1.0 0.0-1.0 ---	0.5-2.0 0.0-0.5 ---	.05 .05 ---	.28 .24 ---	1	8	0
15: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0
16: Isolation	0-1 1-6 6-11 11-24 24-33 33-39 39-51 51-72	--- 8-18 8-18 10-20 10-20 0-10 0-8 0-10	--- 1.25-1.45 1.25-1.45 1.50-1.65 1.50-1.65 1.60-1.70 1.60-1.70 1.60-1.70	--- 2-6 2-6 2-6 2-6 20-40 20-40 6-20	--- 0.07-0.10 0.05-0.07 0.03-0.04 0.03-0.04 0.01-0.02 0.02-0.04 0.05-0.06	--- 0.0-2.9 1.0-1.6 0.0-1.0 0.0-1.0 0.0-0.2 0.0-0.2 0.0-0.5	--- 1.0-3.0 1.0-3.0 0.0-0.5 0.0-0.5 0.0-0.0 0.0-0.0 0.0-0.0	--- .15 .10 .05 .05 .02 .02 .15	--- .24 .24 .32 .32 .10 .10 .15	3	3	86
17: Kawuneeche	0-6 6-12 12-20 20-35 35-61	20-27 20-27 8-18 5-18 1-7	1.15-1.25 1.15-1.25 1.35-1.50 1.60-1.70 1.35-1.75	0.6-2 0.6-2 2-6 6-20 6-20	0.13-0.16 0.13-0.16 0.05-0.07 0.03-0.04 0.01-0.02	0.0-5.0 0.0-2.9 0.0-2.9 0.0-1.2 0.0-0.2	2.0-5.0 2.0-5.0 1.0-5.0 0.0-1.0 0.0-0.0	.20 .20 .05 .05 .02	.20 .20 .20 .15 .10	3	6	48
18: Kawuneeche	0-5 5-12 12-23 23-31 31-66	--- 20-35 8-18 5-18 1-7	0.50-0.90 1.25-1.35 1.25-1.35 1.35-1.45 1.45-1.55	2-6 0.6-2 0.6-2 2-6 6-20	0.23-0.25 0.13-0.19 0.13-0.18 0.08-0.12 0.03-0.05	--- 0.0-5.0 0.0-2.9 0.0-2.0 0.0-0.3	25-50 6.0-12 3.0-7.0 0.0-1.0 0.0-1.0	.05 .20 .37 .28 .05	.05 .20 .37 .28 .20	3	7	38

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
19: Kawuneeche, low precipitation	0-5 5-12 12-23 23-31 31-66	--- 20-35 8-18 5-18 1-7	0.50-0.90 1.25-1.35 1.20-1.35 1.35-1.50 1.60-1.70	2-6 0.6-2 0.6-2 2-6 6-20	0.23-0.25 0.13-0.19 0.13-0.18 0.08-0.12 0.03-0.05	--- 0.0-5.0 0.0-2.9 0.0-2.0 0.0-0.3	20-40 6.0-12 0.5-2.0 0.0-1.0 0.0-1.0	.05 .20 .37 .28 .05	.05 .20 .37 .28 .20	3	6	48
20: Kawuneeche	0-5 5-12 12-23 23-31 31-66	--- 20-35 8-18 5-18 1-7	0.50-0.90 1.25-1.35 1.25-1.35 1.35-1.45 1.45-1.55	2-6 0.6-2 0.6-2 2-6 6-20	0.23-0.25 0.13-0.19 0.13-0.18 0.08-0.12 0.03-0.05	--- 0.0-5.0 0.0-2.9 0.0-2.0 0.0-0.3	20-40 6.0-12 0.5-2.0 0.0-1.0 0.0-1.0	.05 .20 .37 .28 .05	.05 .20 .37 .28 .20	3	7	38
20: Dystrocrypts	0-8 8-20 20-30 30-60	10-20 10-18 10-18 8-18	1.25-1.35 1.25-1.35 1.25-1.45 1.25-1.45	2-6 2-6 2-6 2-6	0.13-0.16 0.13-0.15 0.09-0.15 0.05-0.09	0.0-2.9 0.0-2.9 0.0-2.9 0.0-1.6	3.0-5.0 1.0-3.0 0.0-1.0 0.0-1.0	.20 .28 .32 .15	.20 .28 .32 .32	4	5	56
21: Legault	0-1 1-3 3-8 8-12 12-22	--- 5-15 1-5 1-5 ---	--- 1.35-1.50 1.45-1.60 1.45-1.60 ---	--- 6-20 6-20 6-20 0.00-0.2	--- 0.05-0.07 0.01-0.02 0.01-0.02 ---	--- 0.0-1.6 0.0-0.2 0.0-0.2 ---	--- 0.5-1.0 0.0-0.5 --- ---	--- .10 .05 .05 ---	--- .28 .24 .24 ---	2	8	0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
22: Lumpyridge	0-6 6-11 11-25 25-39 39-45 45-80	8-18 8-18 18-22 20-30 3-10 0-7	1.35-1.50 1.35-1.50 1.25-1.50 1.25-1.50 1.35-1.60 1.35-1.60	2-6 2-6 0.6-2 0.6-2 2-6 6-20	0.07-0.10 0.07-0.10 0.07-0.13 0.07-0.13 0.03-0.06 0.02-0.04	0.0-2.0 2.0-2.9 2.0-2.9 3.0-5.0 0.0-1.0 0.0-0.2	2.0-4.0 1.0-3.0 0.5-2.0 0.5-1.0 0.0-1.0 0.0-0.5	.15 .24 .15 .10 .10 .05	.24 .24 .24 .24 .20 .15	5	3	86
23: Lumpyridge	0-6 6-11 11-25 25-39 39-45 45-80	8-18 8-18 18-22 20-30 3-10 0-7	1.35-1.50 1.35-1.50 1.25-1.50 1.25-1.50 1.35-1.60 1.35-1.60	2-6 2-6 0.6-2 0.6-2 2-6 6-20	0.07-0.10 0.07-0.10 0.07-0.13 0.07-0.13 0.03-0.06 0.02-0.04	0.0-2.0 2.0-2.9 0.0-2.9 3.0-5.0 0.0-1.0 0.0-0.2	2.0-4.0 1.0-3.0 0.5-2.0 0.5-1.0 0.0-1.0 0.0-0.5	.15 .24 .15 .10 .10 .05	.24 .24 .24 .24 .20 .15	5	3	86
23: Rofork	0-5 5-10 10-14 14-24	12-18 12-18 5-10 ---	1.25-1.35 1.30-1.45 1.55-1.70 ---	2-6 2-6 2-6 0.00-0.2	0.05-0.07 0.05-0.07 0.01-0.02 ---	0.0-1.6 0.0-1.6 0.0-0.2 ---	2.0-5.0 1.0-4.0 0.0-1.0 ---	.05 .10 .02 ---	.20 .24 .15 ---	2	8	0
24: Mummy	0-5 5-24 24-72	10-18 10-20 8-18	1.35-1.45 1.35-1.45 1.35-1.55	2-6 2-6 2-6	0.03-0.04 0.03-0.04 0.03-0.07	0.0-1.0 0.0-1.0 0.0-1.0	2.0-6.0 1.0-3.0 0.0-1.0	.02 .05 .10	.15 .24 .28	3	8	0
25: Mummy	0-10 10-21 21-63	10-18 10-20 8-18	1.25-1.35 1.25-1.35 1.25-1.35	2-6 2-6 2-6	0.10-0.13 0.05-0.09 0.05-0.09	0.0-2.9 0.0-1.6 0.0-1.6	3.0-7.0 1.0-3.0 0.5-1.0	.15 .10 .10	.24 .24 .28	3	7	38

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
26: Nanita	0- 1-2 2-7 7-18 18-72	--- 5-10 3-8 3-8 3-10	--- 1.45-1.55 1.45-1.55 1.45-1.55 1.45-1.65	--- 6-20 6-20 2-6 20-101	--- 0.02-0.03 0.02-0.03 0.02-0.03 0.02-0.03	--- 0.0-0.2 0.0-0.2 0.0-0.2 0.0-0.2	--- 0.0-1.0 0.0-0.5 0.0-0.5 0.0-0.5	--- .02 .05 .05 .05	--- .20 .24 .24 .24	2	8	0
27: Nanita	0-1 1-8 8-18 18-28 28-72	--- 5-18 3-8 3-18 3-10	--- 1.35-1.55 1.45-1.55 1.45-1.55 1.45-1.65	--- 6-20 6-20 2-6 20-101	--- 0.05-0.07 0.02-0.03 0.02-0.04 0.01-0.02	--- 0.0-1.6 0.0-0.2 0.0-1.0 0.0-0.2	--- 0.5-2.0 0.0-0.5 0.0-0.5 0.0-0.5	--- .10 .05 .02 .02	--- .28 .24 .32 .15	2	8	0
28: Nanita	0-1 1-10 10-23 23-41 41-71	--- 5-18 0-8 0-18 0-10	--- 1.35-1.45 1.45-1.55 1.60-1.70 1.60-1.70	--- 6-20 6-20 2-6 20-101	--- 0.05-0.07 0.02-0.03 0.01-0.02 0.01-0.02	--- 0.0-1.6 0.0-0.2 0.0-1.0 0.0-1.0	--- 0.0-0.5 0.0-0.0 0.0-0.0 0.0-0.0	--- .10 .05 .02 .02	--- .32 .24 .20 .20	2	8	0
29: Nanita	0-4 4-6 6-15 15-26 26-43 46-71	--- 5-18 5-18 1-8 3-8 2-8	--- 1.35-1.45 1.35-1.45 1.45-1.55 1.45-1.55 1.45-1.55	--- 6-20 6-20 6-20 2-6 6-20	--- 0.07-0.09 0.03-0.04 0.02-0.04 0.01-0.03 0.01-0.02	--- 0.0-2.9 0.0-0.3 0.0-0.2 0.0-0.2 0.0-0.2	--- 0.5-2.0 0.0-0.5 0.0-0.5 0.0-0.5 0.0-0.5	--- .15 .10 .05 .05 .02	--- .24 .24 .20 .20 .10	2	8	0
29: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0

[illegible]

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
32: Cathedral	0-9 9-15 15-60	8-18 5-18 ---	1.35-1.50 1.35-1.50 ---	2-6 2-6 0.00-0.06	0.05-0.07 0.03-0.05 ---	0.0-1.6 0.0-1.0 ---	1.0-3.0 0.5-1.0 ---	.10 .05 ---	.24- .28 ---	1	8	0
33: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0
33: Rubble land	0-60	---	---	20-101	---	---	---	---	---	---	8	0
34: Rock outcrop	0-60	---	---	0.00-0.06	---	---	---	---	---	---	8	0
34: Rubble land	0-60	---	---	20-101	---	---	---	---	---	---	8	0
34: Enentah	0-6 6-20 20-34 34-56 56-72	10-20 8-18 8-18 8-18 5-15	1.25-1.35 1.25-1.35 1.25-1.45 1.35-1.45 1.35-1.55	2-6 2-6 2-6 2-6 6-20	0.07-0.09 0.05-0.07 0.03-0.05 0.03-0.04 0.02-0.04	0.0-1.6 0.0-1.6 0.0-1.0 0.0-1.0 0.0-1.0	0.5-2.0 0.0-1.0 0.0-1.0 0.0-0.5 0.0-0.5	.15 .10 .05 .05 .05	.37 .32 .32 .32 .28	2	8	0
35: Rofork	0-5 5-10 10-14 14-24	12-18 12-18 5-10 ---	1.25-1.35 1.30-1.45 1.55-1.70 ---	2-6 2-6 6-20 0.00-0.2	0.05-0.07 0.05-0.07 0.01-0.02 ---	0.0-1.6 0.0-1.6 0.0-0.2 ---	2.0-5.0 1.0-4.0 0.0-1.0 ---	.05 .10 .02 ---	.20 .24 .15 ---	2	8	0

[illegible]

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
38: Terric Cryofibrists	0-19 19-21 21-32 32-53 53-60	--- --- 15-25 5-20 1-15	--- --- 1.25-1.40 1.25-1.60 1.25-1.60	0.6-2 0.6-2 0.6-2 2-6 2-6	0.20-0.25 0.20-0.25 0.13-0.16 0.05-0.16 0.03-0.07	--- --- 3.0-5.0 0.0-2.9 0.0-1.6	25-75 25-50 1.0-3.0 0.5-3.0 0.0-2.0	.05 .05 .28 .24 .10	.05 .05 .28 .24 .24	3	8	0
39: Tileston	0-3 3-7 7-13 13-28 28-36 36-64	--- 8-18 10-25 10-30 18-30 5-15	--- 1.35-1.45 1.25-1.45 1.25-1.45 1.25-1.45 1.40-1.60	2-6 2-6 0.6-2 0.6-2 0.6-2 2-6	--- 0.05-0.07 0.05-0.09 0.03-0.05 0.03-0.05 0.01-0.04	--- 0.0-1.6 0.0-1.6 0.0-2.0 1.0-2.0 0.0-1.0	--- 0.5-2.0 0.5-1.0 0.0-1.0 0.0-1.0 0.0-0.5	--- .10 .10 .05 .02 .05	--- .28 .24 .24 .24 .28	3	8	0
40: Tonahutu	0-1 1-6 6-21 21-35 35-45 45-62	--- 10-18 5-27 5-27 5-27 5-15	--- 1.35-1.45 1.25-1.45 1.25-1.45 1.25-1.45 1.45-1.55	2-6 2-6 0.6-2 0.6-2 0.6-2 6-20	--- 0.07-0.09 0.03-0.05 0.03-0.05 0.03-0.05 0.03-0.04	--- 0.0-1.6 0.0-3.0 0.0-3.0 0.0-3.0 0.0-0.3	--- 0.5-2.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-0.5	--- .10 .10 .10 .10 .10	--- .28 .28 .28 .28 .24	3	8	0
41: Tonahutu	0-1 1-6 6-21 21-35 35-45 45-62	--- 10-18 5-27 5-27 5-27 5-15	--- 1.35-1.45 1.25-1.45 1.25-1.45 1.25-1.45 1.45-1.55	2-6 2-6 0.6-2 0.6-2 0.6-2 6-20	--- 0.07-0.09 0.03-0.05 0.03-0.05 0.03-0.05 0.03-0.04	--- 0.0-1.6 0.0-3.0 0.0-3.0 0.0-3.0 0.0-0.3	--- 0.5-2.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-0.5	--- .10 .10 .10 .10 .10	--- .28 .28 .28 .28 .24	3	8	0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth (in.)	Clay (pct.)	Moist bulk density (g/cc)	Perme- ability (Ksat) (in./hr.)	Available water- holding capacity (in./in.)	Linear extensi- bility (pct.)	Organic matter (pct.)	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
42: Trailridge	0-6 6-11 11-19 19-29	8-18 8-18 8-18 ---	1.35-1.45 1.35-1.45 1.35-1.45 ---	2-6 2-6 2-6 0.00-0.2	0.03-0.05 0.03-0.04 0.03-0.04 ---	0.0-1.0 0.0-1.0 0.0-0.8 ---	1.0-4.0 1.0-4.0 0.5-2.0 ---	.05 .05 .05 ---	.24 .24 .28 ---	2	8	0
42: Archrock	0-8 8-18 18-25 25-35	10-18 10-18 5-18 ---	1.25-1.35 1.25-1.35 1.35-1.45 ---	2-6 2-6 2-6 0.00-0.2	0.10-0.13 0.07-0.09 0.05-0.07 ---	0.0-2.9 0.0-1.6 0.0-1.0 ---	1.0-5.0 0.5-2.0 0.0-2.0 ---	.15 .15 .10 ---	.24 .37 .24 ---	2	5	56
43: Trailridge	0-6 6-11 11-19 19-29	8-18 8-18 8-18 ---	1.35-1.45 1.35-1.45 1.35-1.45 ---	2-6 2-6 2-6 0.00-0.2	0.03-0.05 0.03-0.04 0.03-0.04 ---	0.0-1.0 0.0-1.0 0.0-0.8 ---	1.0-4.0 1.0-4.0 0.5-2.0 ---	.05 .05 .05 ---	.24 .24 .28 ---	2	8	0
43: Mummy	0-10 10-21 21-63	10-18 10-20 8-18	1.25-1.35 1.25-1.45 1.25-1.45	2-6 2-6 2-6	0.10-0.13 0.05-0.09 0.05-0.09	0.0-2.9 0.0-1.6 0.0-1.6	3.0-7.0 1.0-3.0 0.5-1.0	.15 .10 .10	.24 .24 .28	3	7	38
44: Venable	0-3 3-9 9-14 14-31 31-43 43-63	--- 18-25 18-25 20-30 3-10 27-35	--- 1.15-1.25 1.15-1.25 1.25-1.40 1.60-1.70 1.35-1.50	--- 0.6-2 0.6-2 0.6-2 2-6 0.2-0.6	--- 0.13-0.16 0.13-0.16 0.13-0.16 0.04-0.08 0.07-0.11	--- 3.0-5.0 3.0-5.0 3.0-5.0 0.0-0.5 1.0-2.0	--- 2.0-6.0 2.0-6.0 2.0-5.0 0.0-1.0 0.0-1.0	--- .20 .20 .10 .10 .10	--- .20 .20 .10 .15 .32	5	6	48

Table 9.--Physical Properties of the Soils--Continued

[illegible]

Table 10.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
1: Archrock	0-8 8-18 18-25 25-35	5.0-20 4.0-15 2.0-15 ---	--- --- --- ---	4.5-5.5 4.5-6.0 4.5-6.0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
1: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 4.0-15 4.0-15 4.0-15 2.0-10	--- --- --- --- ---	--- 4.5-5.5 4.5-5.5 4.5-5.5 4.5-6.0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
2: Archrock	0-8 8-18 18-25 25-35	5.0-20 4.0-15 2.0-15 ---	--- --- --- ---	4.5-5.5 4.5-6.0 4.5-6.0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
2: Onahu	0-7 7-16 16-24 24-45 45-55	10-20 5.0-20 3.0-15 2.0-14 ---	--- --- --- --- ---	4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5 ---	0 0 0 0 ---	0 0 0 0 ---	0 0 0 0 ---	0 0 0 0 ---
2: Rock outcrop	0-60	---	---	---	---	---	---	---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
3: Bullwark	0-2	---	---	---	---	---	---	---
	2-9	5.0-15	---	5.6-6.5	0	0	0	0
	9-15	5.0-15	---	5.6-6.5	0	0	0	0
	15-23	4.0-15	---	5.6-6.5	0	0	0	0
	23-32	---	---	---	---	---	---	---
	32-60	---	---	---	---	---	---	---
3: Catamount	0-1	---	---	---	---	---	---	---
	1-3	3.0-15	---	5.1-6.5	0	0	0	0
	3-10	2.0-10	---	5.1-6.5	0	0	0	0
	10-14	2.0-10	---	5.1-6.0	0	0	0	0
	14-24	---	---	---	---	---	---	---
4: Catamount	0-1	---	---	---	---	---	---	---
	1-3	3.0-15	---	5.1-6.5	0	0	0	0
	3-10	2.0-10	---	5.1-6.5	0	0	0	0
	10-14	2.0-10	---	5.1-6.0	0	0	0	0
	14-24	---	---	---	---	---	---	---
5: Catamount	0-1	---	---	---	---	---	---	---
	1-3	3.0-15	---	5.1-6.5	0	0	0	0
	3-10	2.0-10	---	5.1-6.5	0	0	0	0
	10-14	2.0-10	---	5.1-6.0	0	0	0	0
	14-24	---	---	---	---	---	---	---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
5: Bullwark	0-2	---	---	---	---	---	---	---
	2-9	5.0-15	---	5.6-6.5	0	0	0	0
	9-15	5.0-15	---	5.6-6.5	0	0	0	0
	15-23	4.0-15	---	5.6-6.5	0	0	0	0
	23-32	---	---	---	---	---	---	---
	32-60	---	---	---	---	---	---	---
5: Rock outcrop	0-60	---	---	---	---	---	---	---
6: Enentah	0-6	5.0-15	---	5.1-6.0	0	0	0	0
	6-20	3.0-15	---	5.6-6.5	0	0	0	0
	20-34	3.0-15	---	5.6-6.5	0	0	0	0
	34-56	3.0-15	---	5.6-6.5	0	0	0	0
	56-72	2.0-10	---	5.6-6.5	0	0	0	0
7: Enentah	0-6	5.0-15	---	5.1-6.0	0	0	0	0
	6-20	3.0-15	---	5.6-6.5	0	0	0	0
	20-34	3.0-15	---	5.6-6.5	0	0	0	0
	34-56	3.0-15	---	5.6-6.5	0	0	0	0
	56-72	2.0-10	---	5.6-6.5	0	0	0	0
7: Rubble land	0-60	---	---	---	---	---	---	---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
8: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 4.0-15 4.0-15 4.0-15 2.0-10	--- --- --- --- ---	--- 4.5-5.5 4.5-5.5 4.5-5.5 4.5-6.0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
9: Fallriver, warm	0-2 2-9 9-21 21-35 35-63	--- 4.0-15 4.0-15 4.0-15 2.0-10	--- --- --- --- ---	--- 4.5-5.5 4.5-5.5 4.5-5.5 4.5-6.0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
10: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 4.0-15 4.0-15 4.0-15 2.0-10	--- --- --- --- ---	--- 4.5-5.5 4.5-5.5 4.5-5.5 4.5-6.0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
10: Hiamovi	0-5 5-13 13-60	4.0-15 3.0-15 ---	--- --- ---	5.1-6.0 5.1-6.0 ---	0 0 ---	0 0 ---	0 0 ---	0 0 ---
11: Fallriver	0-2 2-9 9-21 21-35 35-63	--- 4.0-15 4.0-15 4.0-15 2.0-10	--- --- --- --- ---	--- 4.5-5.5 4.5-5.5 4.5-5.5 4.5-6.0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
11: Rock outcrop	0-60	---	---	---	---	---	---	---
12: Galuche	0-1 1-3 3-9 9-19 19-60	--- 5.0-20 4.0-15 3.0-15 ---	--- --- --- --- ---	--- 6.1-7.3 5.1-6.0 4.5-6.0 ---	--- 0 0 0 ---	--- 0 0 0 ---	--- 0 0 0 ---	--- 0 0 0 ---
12: Rock outcrop	0-60	---	---	---	---	---	---	---
13: Granile	0-3 3-8 8-21 21-43 43-65	--- 4.0-15 5.0-15 10-25 5.0-15	--- --- --- --- ---	--- 5.6-6.5 5.6-6.5 5.6-6.5 5.6-6.5	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
14: Hiamovi	0-5 5-13 13-60	4.0-15 3.0-15 ---	--- --- ---	5.1-6.0 5.1-6.0 ---	0 0 ---	0 0 ---	0 0 ---	0 0 ---
14: Rock outcrop	0-60	---	---	---	---	---	---	---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
15: Hiamovi	0-5 5-13 13-60	4.0-15 3.0-15 ---	--- --- ---	5.1-6.0 5.1-6.0 ---	0 0 ---	0 0 ---	0 0 ---	0 0 ---
15: Rock outcrop	0-60	---	---	---	---	---	---	---
16: Isolation	0-1 1-6 6-11 11-24 24-33 33-39 39-51 51-72	--- 5.0-15 5.0-15 3.0-10 3.0-10 0.0-5.0 0.0-5.0 1.0-5.0	--- --- --- --- --- --- --- ---	--- 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3	--- 0 0 0 0 0 0 0	--- 0 0 0 0 0 0 0	--- 0 0 0 0 0 0 0	--- 0 0 0 0 0 0 0
17: Kawuneeche	0-6 6-12 12-20 20-35 35-61	10-25 10-25 5.0-20 1.0-5.0 1.0-5.0	--- --- --- --- ---	4.5-5.5 4.5-5.5 5.1-6.0 5.6-6.5 5.6-6.5	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
18: Kawuneeche	0-5 5-12 12-23 23-31 31-66	40-80 20-45 5.0-15 3.0-15 0.0-5.0	--- --- --- --- ---	4.5-5.5 4.5-5.5 4.5-5.5 5.6-6.5 5.6-6.5	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
19: Kawuneeche, low precipitation	0-5 5-12 12-23 23-31 31-66	40-80 20-45 5.0-15 3.0-15 0.0-5.0	--- --- --- --- ---	4.5-5.5 4.5-5.5 4.5-5.5 5.6-6.5 5.6-6.5	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
20: Kawuneeche	0-5 5-12 12-23 23-31 31-66	40-80 20-45 5.0-15 3.0-15 0.0-5.0	--- --- --- --- ---	4.5-5.5 4.5-5.5 4.5-5.5 5.6-6.5 5.6-6.5	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
20: Dystrocrypts	0-8 8-20 20-30 30-60	10-20 5.0-15 4.0-14 3.0-14	--- --- --- ---	4.5-5.5 4.5-5.5 4.5-6.0 4.5-6.0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
21: Legault	0-1 1-3 3-8 8-12 12-22	--- 3.0-1.0 0.0-5.0 0.0-5.0 ---	--- --- --- --- ---	--- 5.5-6.5 5.5-6.5 5.5-6.5 ---	--- 0 0 0 ---	--- 0 0 0 ---	--- 0 0 0 ---	--- 0 0 0 ---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
22: Lumpyridge	0-6 6-11 11-25 25-39 39-45 45-80	5.0-15 4.0-15 10-20 10-25 1.0-11 0.0-5.0	--- --- --- --- --- ---	6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0
23: Lumpyridge	0-6 6-11 11-25 25-39 39-45 45-80	5.0-15 4.0-15 10-20 10-25 1.0-11 0.0-5.0	--- --- --- --- --- ---	6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0
23: Rofork	0-5 5-10 10-14 14-24	10-20 5.0-20 2.0-10 ---	--- --- --- ---	6.1-7.3 6.1-7.3 6.1-7.3 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
24: Mummy	0-5 5-24 24-72	10-25 5.0-25 3.0-15	--- --- ---	4.5-5.5 4.5-5.5 4.5-6.0	0 0 0	0 0 0	0 0 0	0 0 0
25: Mummy	0-10 10-21 21-63	10-20 5.0-20 3.0-18	--- --- ---	4.5-5.5 4.5-5.5 4.5-6.0	0 0 0	0 0 0	0 0 0	0 0 0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
26: Nanita	0-1 1-2 2-7 7-18 18-72	--- 2.0-10 1.0-5.0 1.0-5.0 1.0-5.0	--- --- --- --- ---	--- 5.1-7.3 5.6-7.3 5.6-7.3 5.6-7.3	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
27: Nanita	0-1 1-8 8-18 18-28 28-72	--- 3.0-1.0 1.0-5.0 1.0-6.0 1.0-5.0	--- --- --- --- ---	--- 5.1-7.3 5.6-6.5 5.6-6.5 5.6-6.5	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
28: Nanita	0-1 1-10 10-23 23-41 41-71	--- 3.0-1.0 1.0-5.0 0.0-5.0 0.0-5.0	--- --- --- --- ---	--- 5.1-7.3 5.6-7.3 5.6-7.3 5.6-7.3	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
29: Nanita	0-4 4-6 6-15 15-26 26-43 43-71	--- 3.0-15 1.0-5.0 0.0-5.0 1.0-6.0 0.0-5.0	--- --- --- --- --- ---	--- 5.1-7.3 5.1-7.3 5.6-6.5 5.6-6.5 5.6-6.5	--- 0 0 0 0 0	--- 0 0 0 0 0	--- 0 0 0 0 0	--- 0 0 0 0 0
29: Rock outcrop	0-60	---	---	---	---	---	---	---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
30: Onahu	0-7 7-16 16-24 24-45 45-55	10-20 5.0-20 3.0-15 2.0-14 ---	--- --- --- --- ---	4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5 ---	0 0 0 0 ---	0 0 0 0 ---	0 0 0 0 ---	0 0 0 0 ---
30: Terric Cryofibrists	0-19 19-21 21-32 32-53 53-60	50-150 50-100 10-20 3.0-20 0.0-15	--- --- --- --- ---	4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5 4.5-6.0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
30: Trailridge	0-6 6-11 11-19 19-29	5.0-25 5.0-25 4.0-15 ---	--- --- --- ---	4.5-5.5 4.5-5.5 4.5-6.0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
31: Peeler	0-2 2-10 10-22 22-40 40-62	--- 5.0-20 10-25 10-25 5.0-15	--- --- --- --- ---	--- 5.1-6.5 5.6-7.3 5.6-7.3 6.1-7.3	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0	--- 0 0 0 0
32: Rock outcrop	0-60	---	---	---	---	---	---	---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
32: Cathedral	0-9 9-15 15-60	5.0-20 5.0-15 ---	--- --- ---	5.6-7.3 5.6-7.3 ---	0 0 ---	0 0 ---	0 0 ---	0 0 ---
33: Rock outcrop	0-60	---	---	---	---	---	---	---
33: Rubble land	0-60	---	---	---	---	---	---	---
34: Rock outcrop	0-60	---	---	---	---	---	---	---
34: Rubble land	0-60	---	---	---	---	---	---	---
34: Enentah	0-6 6-20 20-34 34-56 56-72	5.0-15 3.0-15 3.0-15 3.0-10 2.0-10	--- --- --- --- ---	5.1-6.0 5.6-6.5 5.6-6.5 5.6-6.5 5.6-6.5	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
35: Rofork	0-5 5-10 10-14 14-24	10-20 5.0-20 2.0-10 ---	--- --- --- ---	6.1-7.3 6.1-7.3 6.1-7.3 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
35: Chasmfalls	0-4 4-13 13-19 19-28 28-38	10-20 5.0-20 5.0-20 5.0-20 ---	--- --- --- --- ---	5.6-7.3 5.6-7.3 6.1-7.3 6.1-7.3 ---	0 0 0 0 ---	0 0 0 0 ---	0 0 0 0 ---	0 0 0 0 ---
36: Rofork	0-5 5-10 10-14 14-24	10-20 5.0-20 2.0-10 ---	--- --- --- ---	6.1-7.3 6.1-7.3 6.1-7.3 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
36: Isolation	0-1 1-6 6-11 11-24 24-33 33-39 39-51 51-72	--- 5.0-15 5.0-15 3.0-10 3.0-10 0.0-5.0 0.0-5.0 1.0-5.0	--- --- --- --- --- --- --- ---	--- 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3 6.1-7.3	--- 0 0 0 0 0 0 0	--- 0 0 0 0 0 0 0	--- 0 0 0 0 0 0 0	--- 0 0 0 0 0 0 0
37: Rubble land	0-60	---	---	---	---	---	---	---

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
38: Terric Cryofibrists	0-19	50-150	---	4.5-5.5	0	0	0	0
	19-21	50-100	---	4.5-5.5	0	0	0	0
	21-32	10-20	---	4.5-5.5	0	0	0	0
	32-53	3.0-20	---	4.5-5.5	0	0	0	0
	53-60	0.0-15	---	4.5-6.0	0	0	0	0
39: Tileston	0-3	---	---	---	---	---	---	---
	3-7	4.0-15	---	4.5-5.0	0	0	0	0
	7-13	5.0-15	---	4.5-5.5	0	0	0	0
	13-28	4.0-20	---	4.5-5.5	0	0	0	0
	28-36	5.0-25	---	4.5-5.5	0	0	0	0
	36-64	2.0-12	---	4.5-5.5	0	0	0	0
40: Tonahutu	0-1	---	---	---	---	---	---	---
	1-6	3.0-15	---	5.1-6.0	0	0	0	0
	6-21	2.0-20	---	5.1-6.5	0	0	0	0
	21-35	2.0-20	---	5.1-6.5	0	0	0	0
	35-45	3.0-20	---	5.6-6.5	0	0	0	0
	45-62	1.0-5.0	---	5.6-7.3	0	0	0	0
41: Tonahutu	0-1	---	---	---	---	---	---	---
	1-6	3.0-15	---	5.1-6.0	0	0	0	0
	6-21	2.0-20	---	5.1-6.5	0	0	0	0
	21-35	2.0-20	---	5.1-6.5	0	0	0	0
	35-45	3.0-20	---	5.6-6.5	0	0	0	0
	45-62	1.0-5.0	---	5.6-7.3	0	0	0	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
42: Trailridge	0-6 6-11 11-19 19-29	5.0-25 5.0-25 4.0-15 ---	--- --- --- ---	4.5-5.5 4.5-5.5 4.5-6.0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
42: Archrock	0-8 8-18 18-25 25-35	5.0-20 4.0-15 2.0-15 ---	--- --- --- ---	4.5-5.5 4.5-6.0 4.5-6.0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
43: Trailridge	0-6 6-11 11-19 19-29	5.0-25 5.0-25 4.0-15 ---	--- --- --- ---	4.5-5.5 4.5-5.5 4.5-6.0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---	0 0 0 ---
43: Mummy	0-10 10-21 21-63	10-20 5.0-20 3.0-18	--- --- ---	4.5-5.5 4.5-5.5 4.5-6.0	0 0 0	0 0 0	0 0 0	0 0 0
44: Venable	0-3 3-9 9-14 14-31 31-43 43-63	--- 10-25 10-25 10-30 1.0-10 10-25	--- --- --- --- --- ---	--- 5.6-7.3 5.6-7.3 5.6-7.3 5.6-7.3 5.6-7.3	--- 0 0 0 0 0	--- 0 0 0 0 0	--- 0 0 0 0 0	--- 0 0 0 0 0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	(inches)	meq/100 g	meq/100g	pH	(percent)	(percent)	mmhos/cm	
45: Ypsilon	0-6	---	---	---	---	---	---	---
	6-14	4.0-15	---	3.5-5.5	0	0	0	0
	14-19	3.0-15	---	3.5-5.0	0	0	0	0
	19-24	5.0-15	---	3.5-5.0	0	0	0	0
	24-35	5.0-15	---	3.5-5.0	0	0	0	0
	35-67	0.0-5.0	---	4.5-5.5	0	0	0	0

Table 11.--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				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
1: Archrock	Bedrock (paralithic)	20-40	---	Weakly cemented	0	---	Moderate	High	High
1: Fallriver	---	---	---	---	0	---	Moderate	Moderate	Moderate
2: Archrock	Bedrock (paralithic)	20-40	---	Weakly cemented	0	---	Moderate	High	High
2: Onahu	Bedrock (paralithic)	40-60	---	Weakly cemented	0	---	Moderate	High	High
2: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	None	---	---
3: Bullwark	Bedrock (paralithic) Bedrock (lithic)	20-40 30-50	---	Weakly cemented Indurated	0	---	Moderate	Moderate	Moderate
3: Catamount	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	Moderate	Moderate

Table 11.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
4: Catamount	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	Moderate	Moderate
5: Catamount	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	Moderate	Moderate
5: Bullwark	Bedrock (paralithic) Bedrock (lithic)	20-40 30-50	---	Weakly cemented Indurated	0	---	Moderate	Moderate	Moderate
5: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	---	---	---
6: Enentah	---	---	---	---	0	---	Moderate	Moderate	Low
7: Enentah	---	---	---	---	0	---	Moderate	Moderate	Low
7: Rubble land	---	---	---	---	---	---	---	---	---
8: Fallriver	---	---	---	---	0	---	Moderate	Moderate	Moderate

Table 11.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
9: Fallriver, warm	---	---	---	---	0	---	Moderate	Moderate	Moderate
10: Fallriver	---	---	---	---	0	---	Moderate	Moderate	Moderate
10: Hiamovi	Bedrock (lithic)	10-20	---	Indurated	0	---	Moderate	Low	Low
11: Fallriver	---	---	---	---	0	---	Moderate	Moderate	Moderate
11: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	---	---	---
12: Galuche	Bedrock (lithic)	10-20	---	Indurated	0	---	Moderate	Moderate	Low
12: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	None	---	---
13: Granile	---	---	---	---	0	---	Moderate	Moderate	Moderate
14: Hiamovi	Bedrock (lithic)	10-20	---	Indurated	0	---	Moderate	Low	Low

Table 11.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
14: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	---	---	---
15: Hiamovi	Bedrock (lithic)	10-20	---	Indurated	0	---	Moderate	Low	Low
15: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	---	---	---
16: Isolation	---	---	---	---	0	---	Moderate	Low	Low
17: Kawuneeche	---	---	---	---	0	---	Moderate	High	Moderate
18: Kawuneeche	---	---	---	---	0	---	Moderate	Moderate	Low
19: Kawuneeche, low precipitation	---	---	---	---	0	---	High	High	Moderate
20: Kawuneeche	---	---	---	---	0	---	Moderate	Moderate	Low

Table 11.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
20: Dystrocryepts	---	---	---	---	0	---	Moderate	High	High
21: Legault	Bedrock (paralithic)	5-20	---	Weakly cemented	0	---	Low	Moderate	Low
22: Lumpyridge	---	---	---	---	0	---	Moderate	Moderate	Low
23: Lumpyridge	---	---	---	---	0	---	Moderate	Moderate	Low
23: Rofork	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	Moderate	Low
24: Mummy	---	---	---	---	0	---	Moderate	High	High
25: Mummy	---	---	---	---	0	---	Moderate	High	High
26: Nanita	---	---	---	---	0	---	Low	Low	Low
27: Nanita	---	---	---	---	0	---	Low	Low	Low

Table 11.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
28: Nanita	---	---	---	---	0	---	Low	Low	Low
29: Nanita	---	---	---	---	0	---	Low	Low	Low
29: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	---	---	---
30: Onahu	Bedrock (paralithic)	40-60	---	Weakly cemented	0	---	Moderate	High	High
30: Terric Cryofibrists	---	---	---	---	3-8	6-16	High	Moderate	Moderate
30: Trailridge	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	High	High
31: Peeler	---	---	---	---	0	---	Moderate	Low	Low
32: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	None	---	---
32: Cathedral	Bedrock (paralithic)	10-20	---	Indurated	0	---	Moderate	Low	Low

Table 11.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
33: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	None	---	---
33: Rubble land	---	---	---	---	---	---	None	---	---
34: Rock outcrop	Bedrock (lithic)	0-0	---	Indurated	---	---	None	---	---
34: Rubble land	---	---	---	---	---	---	None	---	---
34: Enentah	---	---	---	---	0	---	Moderate	Moderate	Low
35: Rofork	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	Moderate	Low
35: Chasmfalls	Bedrock (paralithic)	20-40	---	Weakly cemented	0	---	Moderate	Moderate	Low
36: Rofork	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	Moderate	Low
36: Isolation	---	---	---	---	0	---	Moderate	Low	Low

Table 11.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top (in.)	Thickness (in.)	Hardness	Initial (in.)	Total (in.)		Uncoated steel	Concrete
37: Rubble land	---	---	---	---	---	---	None	---	---
38: Terric Cryofibrists	---	---	---	---	3-8	6-16	High	Moderate	Moderate
39: Tileston	---	---	---	---	0	---	Moderate	Moderate	Moderate
40: Tonahutu	---	---	---	---	0	---	Moderate	Moderate	Low
41: Tonahutu	---	---	---	---	0	---	Moderate	Moderate	Low
42: Trailridge	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	High	High
42: Archrock	Bedrock (paralithic)	20-40	---	Weakly cemented	0	---	Moderate	High	High
43: Trailridge	Bedrock (paralithic)	10-20	---	Weakly cemented	0	---	Moderate	High	High
43: Mummy	---	---	---	---	0	---	Moderate	High	High

Table 11.--Soil Features--Continued

[illegible]

Table 12.--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	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
1: Archrock	C	Jan-Dec	---	---	---	---	None	---	None
1: Fallriver	B	Jan-Dec	---	---	---	---	None	---	None
2: Archrock	C	Jan-Dec	---	---	---	---	None	---	None
2: Onahu	C	June July August Sept	0.5-1.5 0.5-1.5 0.5-1.5 0.8-2.0	3.3-5.0 3.3-5.0 3.3-5.0 3.3-5.0	--- --- --- ---	--- --- --- ---	None None None None	--- --- --- ---	None None None None
2: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
3: Bullwark	C	Jan-Dec	---	---	---	---	None	---	None
3: Catamount	D	Jan-Dec	---	---	---	---	None	---	None
4: Catamount	D	Jan-Dec	---	---	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
5: Catamount	D	Jan-Dec	---	---	---	---	None	---	None
5: Bullwark	C	Jan-Dec	---	---	---	---	None	---	None
5: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
6: Enentah	B	Jan-Dec	---	---	---	---	None	---	None
7: Enentah	B	Jan-Dec	---	---	---	---	None	---	None
7: Rubble land	B	Jan-Dec	---	---	---	---	None	---	None
8: Fallriver	B	Jan-Dec	---	---	---	---	None	---	None
9: Fallriver, warm	B	Jan-Dec	---	---	---	---	None	---	None
10: Fallriver	B	Jan-Dec	---	---	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
10: Hiamovi	D	Jan-Dec	---	---	---	---	None	---	None
11: Fallriver	B	Jan-Dec	---	---	---	---	None	---	None
11: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
12: Galuche	D	Jan-Dec	---	---	---	---	None	---	None
12: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
13: Granile	B	Jan-Dec	---	---	---	---	None	---	None
14: Hiamovi	D	Jan-Dec	---	---	---	---	None	---	None
14: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
15: Hiamovi	D	Jan-Dec	---	---	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
15: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
16: Isolation	B	Jan-Dec	---	---	---	---	None	---	None
17: Kawuneeche	C	May June July August Sept	1.0-1.5 1.0-1.5 1.0-1.5 1.5-2.5 2.0-3.0	>6.0 >6.0 >6.0 >6.0 >6.0	--- --- --- --- ---	--- --- --- --- ---	None None None None None	Brief Brief Brief --- ---	Occasional Occasional Occasional None None
18: Kawuneeche	D	April May June July August Sept	0.8-2.0 1.0-1.5 1.0-1.5 1.0-1.5 1.5-2.5 0.8-2.0	>6.0 >6.0 >6.0 >6.0 >6.0 >6.0	--- --- --- --- --- ---	--- --- --- --- --- ---	None None None None None None	--- Brief Brief Brief --- ---	None Frequent Frequent Frequent None None
19: Kawuneeche, low precipitation	D	April May June July August Sept	0.5-2.0 0.5-2.0 0.0-1.5 0.0-1.5 0.0-1.5 0.8-2.0	>6.0 >6.0 >6.0 >6.0 >6.0 >6.0	--- --- --- --- --- ---	--- --- --- --- --- ---	None None None None None None	--- Brief Brief Brief --- ---	None Frequent Frequent Frequent None None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
20: Kawuneeche	D	April May June July August Sept	0.8-2.0 0.6-1.5 0.0-1.5 0.0-1.5 0.0-1.5 2.0-3.0	>6.0 >6.0 >6.0 >6.0 >6.0 >6.0	--- --- --- --- --- ---	--- --- --- --- --- ---	None None None None None None	--- Brief Brief Brief --- ---	None Occasional Frequent Occasional None None
20: Dystrocrypts	B	May June July August	2.0-5.0 2.0-5.0 2.0-5.0 2.0-5.0	>6.0 >6.0 >6.0 >6.0	--- --- --- ---	--- --- --- ---	None None None None	--- Very brief Very brief ---	None Rare Rare None
21: Legault	D	Jan-Dec	---	---	---	---	None	---	None
22: Lumpyridge	B	Jan-Dec	---	---	---	---	None	---	None
23: Lumpyridge	B	Jan-Dec	---	---	---	---	None	---	None
23: Rofork	D	Jan-Dec	---	---	---	---	None	---	None
24: Mummy	B	Jan-Dec	---	---	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
25: Mummy	B	Jan-Dec	---	---	---	---	None	---	None
26: Nanita	A	Jan-Dec	---	---	---	---	None	---	None
27: Nanita	A	Jan-Dec	---	---	---	---	None	---	None
28: Nanita	A	Jan-Dec	---	---	---	---	None	---	None
29: Nanita	A	Jan-Dec	---	---	---	---	None	---	None
29: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
30: Onahu	C	May June July August Sept	0.5-1.5 0.5-1.5 0.5-1.5 0.5-1.5 0.8-2.0	3.3-5.0 3.3-5.0 3.3-5.0 3.3-5.0 3.3-5.0	--- --- --- --- ---	--- --- --- --- ---	None None None None None	--- --- --- --- ---	None None None None None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
30: Terric Cryofibrists	D	April	0.0-1.5	>6.0	---	---	None	---	None
		May	0.0-1.5	>6.0	0.0-0.5	Brief	Occasional	---	None
		June	0.0-1.5	>6.0	0.2-1.0	Long	Occasional	---	None
		July	0.0-1.5	>6.0	0.0-0.5	Brief	Occasional	---	None
		August	0.0-1.5	>6.0	---	---	None	---	None
		Sept	0.0-1.5	>6.0	---	---	None	---	None
		Oct	0.0-1.5	>6.0	---	---	None	---	None
		Nov	0.0-1.5	>6.0	---	---	None	---	None
30: Trailridge	D	Jan-Dec	---	---	---	---	None	---	None
31: Peeler	B	Jan-Dec	---	---	---	---	None	---	None
32: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
32: Cathedral	D	Jan-Dec	---	---	---	---	None	---	None
33: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
33: Rubble land	A	Jan-Dec	---	---	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
34: Rock outcrop	D	Jan-Dec	---	---	---	---	None	---	None
34: Rubble land	A	Jan-Dec	---	---	---	---	None	---	None
34: Enentah	B	Jan-Dec	---	---	---	---	None	---	None
35: Rofork	D	Jan-Dec	---	---	---	---	None	---	None
35: Chasmfalls	C	Jan-Dec	---	---	---	---	None	---	None
36: Rofork	D	Jan-Dec	---	---	---	---	None	---	None
36: Isolation	B	Jan-Dec	---	---	---	---	None	---	None
37: Rubble land	A	Jan-Dec	---	---	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
38: Terric Cryofibrists	D	April	0.0-1.5	>6.0	---	---	None	---	None
		May	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		June	0.0-1.5	>6.0	---	---	None	Long	Frequent
		July	0.0-1.5	>6.0	---	---	None	Brief	Frequent
		August	0.0-1.5	>6.0	---	---	None	---	None
		Sept	0.0-1.5	>6.0	---	---	None	---	None
		Oct	0.0-1.5	>6.0	---	---	None	---	None
		Nov	0.0-1.5	>6.0	---	---	None	---	None
39: Tileston	B	Jan-Dec	---	---	---	---	None	---	None
40: Tonahutu	B	Jan-Dec	---	---	---	---	None	---	None
41: Tonahutu	B	Jan-Dec	---	---	---	---	None	---	None
42: Trailridge	D	Jan-Dec	---	---	---	---	None	---	None
42: Archrock	C	Jan-Dec	---	---	---	---	None	---	None
43: Trailridge	D	Jan-Dec	---	---	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Ponding			Flooding	
			Upper limit (ft.)	Lower limit (ft.)	Surface water depth	Duration	Frequency	Duration	Frequency
43: Mummy	B	Jan-Dec	---	---	---	---	None	---	None
44: Venable	D	April May June July August Sept	0.0-3.0 0.0-2.0 0.0-2.0 0.0-2.0 0.0-2.0 0.0-3.0	>6.0 >6.0 >6.0 >6.0 >6.0 >6.0	--- --- --- --- --- ---	--- --- --- --- --- ---	None None None None None None	--- Brief Brief Brief --- ---	None Occasional Occasional Occasional None None
45: Ypsilon	B	Jan-Dec	---	---	---	---	None	---	None

Table 13.--Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series.)

Soil name	Family or higher taxonomic class
Archrock	Loamy-skeletal, paramicaceous Humic Dystrocryepts
Bullwark	Loamy-skeletal, paramicaceous Lamellic Eutrocryepts
Catamount	Loamy-skeletal, paramicaceous, shallow Ustic Dystrocryepts
Cathedral	Loamy-skeletal, paramicaceous, frigid Lithic Haplustolls
Chasmfalls	Coarse-loamy, paramicaceous, frigid Pachic Haplustolls
Dystrocryepts	Dystrocryepts
Enentah	Loamy-skeletal, mixed, superactive Typic Eutrocryepts
Fallriver	Loamy-skeletal, isotic Typic Dystrocryepts
Galuche	Loamy-skeletal, paramicaceous, frigid Lithic Dystrustepts
Granile	Loamy-skeletal, mixed, superactive Ustic Glossocryalfs
Hiamovi	Loamy-skeletal, paramicaceous Lithic Dystrocryepts
Isolation	Loamy-skeletal, mixed, superactive, frigid Alfic Argiustolls
Kawuneeche	Coarse-loamy, mixed, superactive, nonacid Fluvaquentic Cryaquepts
Legault	Sandy-skeletal, paramicaceous, shallow Typic Cryorthents

Table 13.--Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Lumpyridge	Fine-loamy, paramicaceous, frigid Typic Argiustolls
Mummy	Loamy-skeletal, paramicaceous Humic Dystrocryepts
Nanita	Sandy-skeletal, mixed Lamellic Cryorthents
Onahu	Loamy-skeletal, paramicaceous, acid Aeris Humic Cryaquepts
*Peeler	Fine-loamy, mixed, superactive Ustic Glossocryalfs
Rofork	Loamy-skeletal, paramicaceous, frigid, shallow Entic Haplustolls
Terric Cryofibrists	Terric Cryofibrists
Tileston	Loamy-skeletal, isotic Typic Glossocryalfs
Tonahutu	Loamy-skeletal, mixed, superactive Lamellic Haplocryalfs
Trailridge	Loamy-skeletal, paramicaceous, shallow Humic Dystrocryepts
*Venable	Fine-loamy, mixed, superactive Cumulic Cryaquolls
Ypsilon	Loamy-skeletal, isotic Typic Haplocryods

Table 14.--Soil Map Legend

Map symbol	Soil name
1	Archrock-Fallriver association, 15 to 50 percent slopes
2	Archrock-Onahu-Rock outcrop complex, 10 to 75 percent slopes
3	Bullwark-Catamount complex, 20 to 50 percent slopes
4	Catamount gravelly coarse sandy loam, 5 to 20 percent slopes
5	Catamount-Bullwark-Rock outcrop complex, 10 to 40 percent slopes
6	Enentah very stony loam, 10 to 40 percent slopes
7	Enentah-Rubble land complex, 25 to 70 percent slopes
8	Fallriver gravelly sandy loam, 10 to 45 percent slopes
9	Fallriver gravelly sandy loam, warm, 10 to 45 percent slopes
10	Fallriver-Hiamovi complex, 10 to 55 percent slopes
11	Fallriver-Rock outcrop complex, 30 to 70 percent slopes
12	Galuche-Rock outcrop complex, 20 to 90 percent slopes
13	Granile very gravelly coarse sandy loam, 30 to 60 percent slopes
14	Hiamovi-Rock outcrop complex, 5 to 40 percent slopes
15	Hiamovi-Rock outcrop complex, 15 to 80 percent slopes
16	Isolation gravelly sandy loam, 5 to 35 percent slopes
17	Kawuneeche loam, 0 to 1 percent slope
18	Kawuneeche mucky peat, 0 to 4 percent slopes
19	Kawuneeche mucky peat, low precipitation, 0 to 1 percent slope
20	Kawuneeche-Dystrocryepts complex, 1 to 15 percent slopes
21	Legault very gravelly sandy loam, 15 to 45 percent slopes
22	Lumpyridge gravelly coarse sandy loam, 1 to 6 percent slopes
23	Lumpyridge-Rofork complex, 3 to 15 percent slopes
24	Mummy extremely cobbly sandy loam, 20 to 50 percent slopes
25	Mummy gravelly sandy loam, 10 to 35 percent slopes
26	Nanita extremely gravelly loamy coarse Sand, 30 to 60 percent slopes
27	Nanita very gravelly sandy loam, 1 to 15 percent slopes
28	Nanita very gravelly sandy loam, 10 to 60 percent slopes
29	Nanita-Rock outcrop complex, 10 to 40 percent slopes

Table 14.--Soil Map Legend

Map symbol	Soil name
30	Onahu-Terric Cryofibrists-Trailridge complex, 2 to 35 percent slopes
31	Peeler loam, 5 to 40 percent slopes
32	Rock outcrop-Cathedral complex, 20 to 100 percent slopes
33	Rock outcrop-Rubble land complex, 30 to 200 percent slopes
34	Rock outcrop-Rubble land-Enentah complex, 40 to 200 percent slopes
35	Rofork-Chasmfalls complex, 5 to 35 percent slopes
36	Rofork-Isolation complex, 5 to 35 percent slopes
37	Rubble land, 20 to 65 percent slopes
38	Terric Cryofibrists, 0 to 2 percent slopes
39	Tileston very cobbly sandy loam, 10 to 40 percent slopes
40	Tonahutu very gravelly sandy loam, 15 to 30 percent slopes
41	Tonahutu very gravelly sandy loam, 30 to 50 percent slopes
42	Trailridge-Archrock complex, 10 to 40 percent slopes
43	Trailridge-Mummy complex, 20 to 60 percent slopes
44	Venable loam, 0 to 1 percent slope
45	Ypsilon gravelly coarse sandy loam, 20 to 50 percent slopes
46	Water