United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

In cooperation with

United States
Department of
the Interior,
National Park
Service

and University of California,
Davis

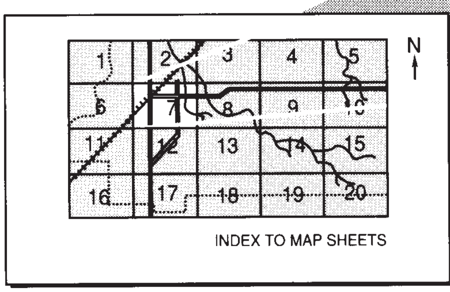
Soil Survey of Pinnacles National Monument, California

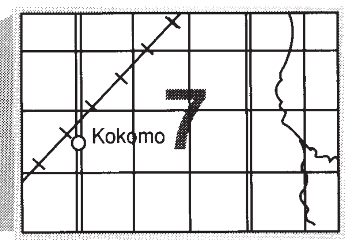
How To Use This Soil Survey

Detailed Soil Maps

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

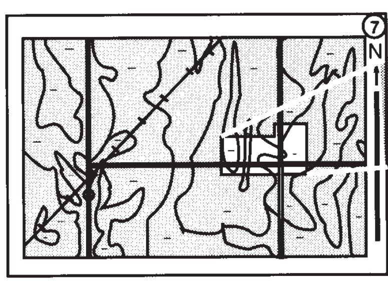
To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.



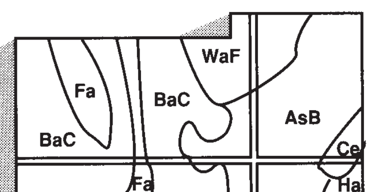


MAP SHEET

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



MAP SHEET



AREA OF INTEREST

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

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

National Cooperative Soil Survey

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and 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 2006. Soil names and descriptions were approved in 2006. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2006. This survey was made cooperatively by the Natural Resources Conservation Service and the United States Department of the Interior, National Park Service, and University of California, Davis. The survey is part of the technical assistance furnished to the National Park Service.

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.

Since the publication of this survey, more information on soil properties may have been collected, new interpretations may have been developed, or existing interpretive criteria may have been modified. The most current soil information and interpretations for this survey are in the Field Office Technical Guide (FOTG) at the local field office of the Natural Resources Conservation Service. The soil maps in this publication are in digital form. The digitizing of the maps was completed in accordance with the Soil Survey Geographic (SSURGO) database standards. The digital SSURGO-certified maps are considered the official maps for the survey area and are part of the FOTG at the local field office of the Natural Resources Conservation Service.

Nondiscrimination Statement

Citation

The correct citation for this survey is as follows:

United States Department of Agriculture, Natural Resources Conservation Service. 2007. Soil survey of Pinnacles National Monument, California. Accessible online at: http://soils.usda.gov/survey/printed_surveys/.

Cover Caption

View from North Chalone Peak, extending from Hawkins Peak down to Bear Creek. Shown are the pinnacles of rhyolitic breccia, Burgundy extremely gravelly sandy loam under the paler patches of grasses and forbs, and Argixerolls gravelly sandy loam under the darker patches of chamise chaparral.

Contents

Issued January 2008

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.

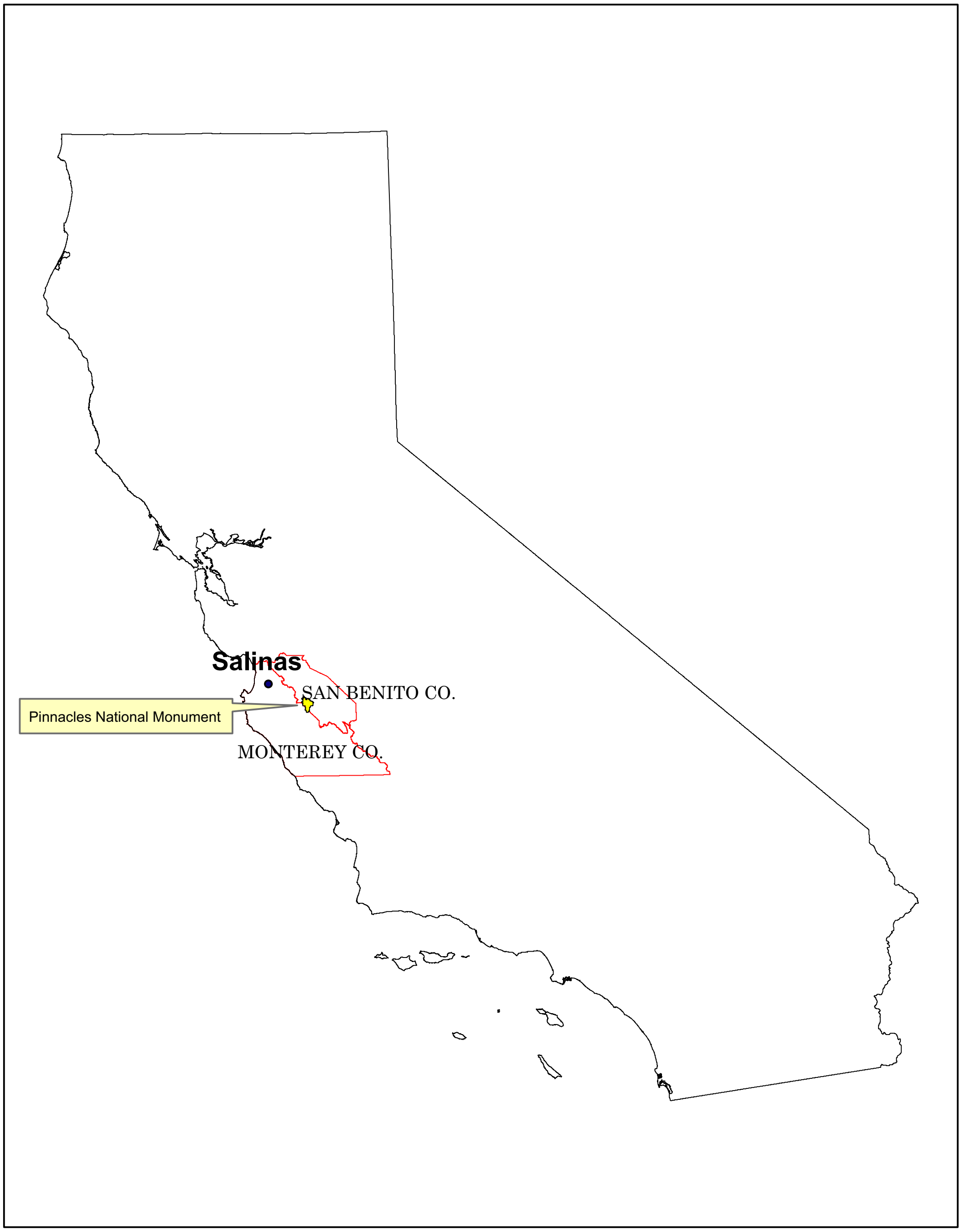
This soil survey is designed for use by the National Park Service. It can be used for resource education and management of the survey area for use as recreation, watershed, and wildlife habitat. The National Park Service staff can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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

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

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. 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.

Lincoln “Ed” Burton
State Conservationist
Natural Resources Conservation Service



Location of Pinnacles National Monument in California.

Soil Survey of
Pinnacles National Monument, California

By Ken Oster, Natural Resources Conservation Service

Fieldwork by Ken Oster, Valerie Bullard, Andrew Conlin, Kevin Connelly, Alaina Frazier, Daniel Hohensee, Bruce Lindsay, and Kendra Moseley, Natural Resources Conservation Service, and Dylan Beaudette, University of California, Davis.

Technical support, quality assurance, and field assistance provided by Susan Southard, Natural Resources Conservation Service, and block diagrams provided by David Howell, Natural Resources Conservation Service.

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
United States Department of the Interior, National Park Service, and University of California, Davis.

Pinnacles National Monument includes parts of Monterey and San Benito Counties. It has a total area of 27,095 acres. The survey area straddles the county line between Monterey and San Benito Counties about 23 miles southeast of Salinas, California. Elevation ranges from 824 to 3,304 feet. The survey area is in two major land resource areas (MLRAs)—Central California Coast Range (MLRA 15) and Central California Coastal Valleys (MLRA 14). The major landform is steep hills. The climate is Mediterranean with an average annual precipitation of 16 inches. The area supports chaparral, grassland, and oak woodland. It is used mainly as watershed, wildlife habitat, and recreation.

This soil survey updates portions of the soil surveys of Monterey County, California (USDA, 1978), and San Benito County, California (USDA, 1969).

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Pinnacles National Monument in the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 48.0 degrees F and the average daily minimum temperature is 33.4 degrees. The lowest temperature on record is 10.0 degrees. In summer, the average temperature is 70.6 degrees and the average daily maximum temperature is 91.9 degrees. The highest recorded temperature is 116.0 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40.0 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 17.1 inches. Of this, 2.2 inches, or 12.7 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 0.3 inch.

The average seasonal snowfall is about 0.3 inch. On the average, there are no days during the year when at least 1 inch of snow is on the ground.

The average relative humidity in midafternoon is about 45 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The prevailing wind is from the northeast in the morning and from the northwest in the afternoon. Average windspeed is highest, 5.3 miles per hour, in April through July (USDI, 2006).

How This Survey Was Made

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

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

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

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

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses.

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

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

Detailed Soil Map Units

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. 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 may be identified by a special symbol on the maps. 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. The numeric map unit symbols used for this publication are new. Alphabetic map unit symbols were used in older surveys that included part of this area. The older map unit symbols in this survey have not been updated to numeric symbols; however, the data for all of the map units have been updated.

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, Tuborcio sandy loam, 2 to 20 percent slopes, is a phase of the Tuborcio series.

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

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. Chalone-Knuckle-Rock outcrop complex, 35 to 50 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. Ordeal-Passion-Badlands association, 50 to 100 percent slopes, is an example.

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

Table 4 gives the acreage and proportionate extent of each map unit. Table 5 gives the mean annual precipitation, landscape, parent material, and ecological site for each soil in the survey area. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas. The block diagram on the following page relates some of the soils in the area to the landforms and geology.

For each soil in the map unit descriptions, the hydrophobicity class is given as a surface feature under the side head “Properties and qualities.” Soil hydrophobicity is the resistance of the soil to wetting. It may result from the accumulation of fatty or waxy substances deposited on the soil by vegetation. These substances coat the soil grains and can penetrate deeper into the soil when volatized by wildfire. Soils coated with hydrophobic substances resist the infiltration of water, shed more storm water as runoff, and are more vulnerable to erosion (Taskey, 2004).

101—Ordeal-Passion-Badlands association, 50 to 100 percent slopes

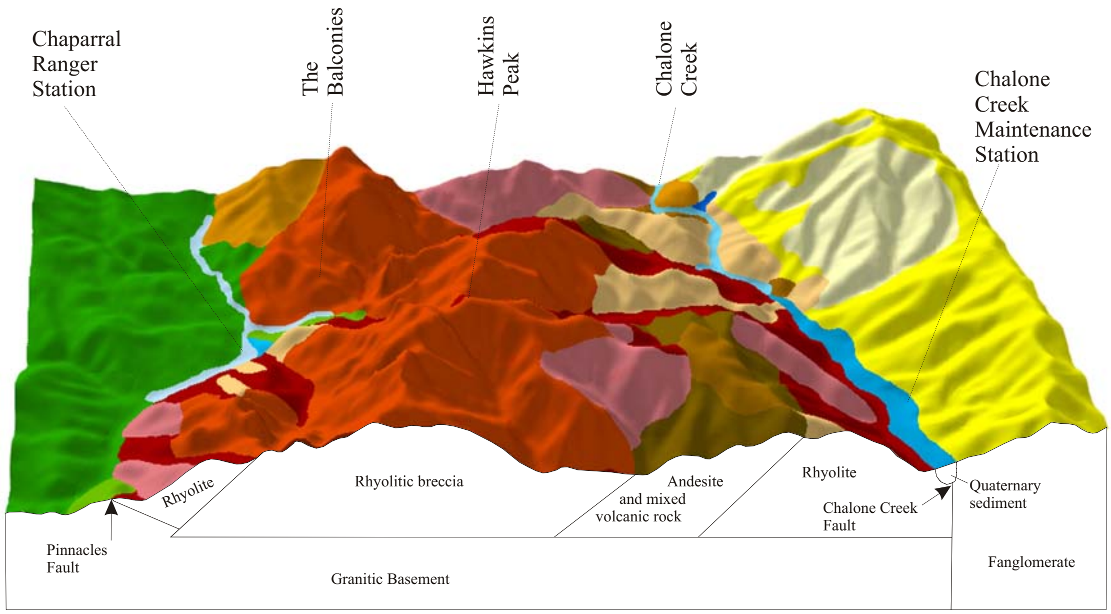
Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,300 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Ordeal and similar soils: 50 percent
Passion and similar soils: 30 percent
Badlands: 10 percent
Minor components: 10 percent

Block Diagram Relating Soils, Landforms, and Geology



Conceptual representation of geology. Vertical exaggeration 1.5:1.

Detailed Soil Map Units

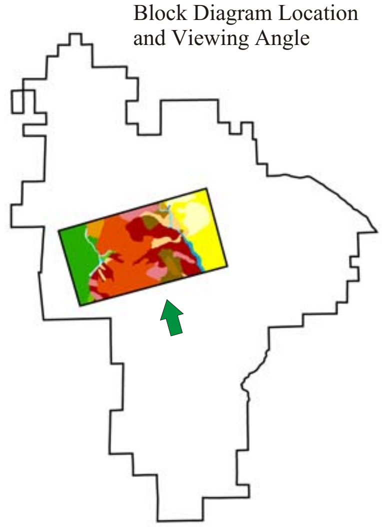
Stream Terraces Composed of Alluvium
- 113 Elder-Oxyaquic Haploxerolls complex, 2 to 5 percent slopes
- 132 Toags-Oxyaquic Haploxerolls-Riverwash complex, 0 to 2 percent slopes
- 134 Toags gravelly coarse sand, 2 to 9 percent slopes
- 135 Toags-Riverwash complex, 0 to 9 percent slopes
- 136 Oxyaquic Haploxerolls, 0 to 1 percent slopes

Hills Composed of Volcanic Rock
- 104 Knuckle-Burgundy-Argixerolls complex, 50 to 70 percent slopes
- 105 Chalone-Firstsister-Highpeaks complex, 50 to 70 percent slopes
- 106 Casino-Argixerolls complex, 50 to 70 percent slopes
- 107 Casino sandy clay loam, 20 to 35 percent slopes
- 109 Rock outcrop-Highpeaks-Burgundy complex, 35 to 100 percent slopes
- 110 Knuckle-Chalone-Burgundy complex, 35 to 70 percent slopes
- 138 Rock outcrop-Highpeaks-Chalone complex, 35 to 50 percent slopes

Hills Composed of Sedimentary Rock
- 101 Ordeal-Passion-Badlands association, 50 to 100 percent slopes
- 114 Ordeal-Tuborcio-Passion complex, 20 to 50 percent slopes
- 142 Ordeal-Longsfolly-Passion complex, 9 to 50 percent slopes

Hills Composed of Granite
- 122 Tuborcio sandy loam, 35 to 50 percent slopes
- 148 Backdoor-Tuborcio complex, 35 to 50 percent slopes

Pinnacles National Monumer
Block Diagram Location
and Viewing Angle



Major Components

Ordeal

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 75 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from fanglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 10 to 30 percent with fine subangular gravel, 5 to 20 percent with subangular cobbles, and 5 to 20 percent with subangular stones
Surface feature: Moderately hydrophobic
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.4 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 5 inches; sandy loam
A2—5 to 16 inches; very gravelly loamy sand
C—16 to 21 inches; extremely gravelly sandy loam
Cr—21 to 25 inches; bedrock

Passion

Landform: Hills
Landform position (two-dimensional): Shoulders, backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 75 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from fanglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 45 to 55 percent with coarse subangular gravel, 20 to 30 percent with subangular cobbles, and 5 to 15 percent with subrounded stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)

Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.9 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, rattail fescue, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 3 inches; gravelly loamy sand
A2—3 to 8 inches; gravelly loamy sand
C—8 to 13 inches; very gravelly loamy coarse sand
Cr—13 to 61 inches; very gravelly loamy sand

Badlands

Landform: Scarps, hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 75 to 100 percent
Parent material: Residuum derived from fanglomerate

Properties and qualities
Land capability class (nonirrigated): 8

Minor Components

Ordeal soils
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Toags soils
Percentage of map unit: 5 percent
Landform: Outwash fan valleys
Slope range: 2 to 9 percent
Hydric classification: Not hydric

104—Knuckle-Burgundy-Argixerolls complex, 20 to 70 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,490 feet
Mean annual precipitation: 17 to 19 inches

Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Knuckle and similar soils: 35 percent
Burgundy and similar soils: 25 percent
Argixerolls and similar soils: 15 percent
Minor components: 25 percent

Major Components

Knuckle

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 20 to 50 percent with coarse angular gravel, 15 to 20 percent with angular cobbles, and 5 to 10 percent with angular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.6 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Bushy spikemoss, black sage, wild oat, California buckwheat

Typical profile
A1—0 to 6 inches; very gravelly loamy sand
A2—6 to 17 inches; very gravelly loamy sand
Bw—17 to 20 inches; extremely gravelly loamy sand
R—20 to 21 inches; bedrock

Burgundy

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 75 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities

Percentage of surface covered with coarse fragments: 35 to 80 percent with fine subangular gravel and 5 to 10 percent with subangular cobbles
Surface features: Moderately hydrophobic; rilled between spikemoss clusters (soil accumulates upslope of spikemoss clusters)
Depth to restrictive feature: 6 to 10 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.4 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
Common trees: Foothill pine
Overstory vegetation: Chamise
Understory vegetation: Bushy spikemoss, California buckwheat

Typical profile

A1—0 to 1 inch; extremely gravelly coarse sandy loam
A2—1 to 6 inches; extremely gravelly coarse sandy loam
R—6 to 7 inches; bedrock

Argixerolls

Landform: Hills
Landform position (two-dimensional): Backslopes, shoulders
Landform position (three-dimensional): Side slopes, interfluves
Slope range: 20 to 35 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite and/or residuum derived from andesite

Properties and qualities

Percentage of surface covered with coarse fragments: 35 to 45 percent with coarse subangular gravel, 5 to 15 percent with subangular cobbles, and 0 to 10 percent with subangular stones
Surface feature: Moderately hydrophobic
Depth to restrictive feature: 20 to 31 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.2 inches)

Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise, buckbrush
Understory vegetation: Bushy spikemoss, black sage, California buckwheat

Typical profile
A1—0 to 4 inches; gravelly sandy loam
A2—4 to 10 inches; loam
Bt—10 to 27 inches; very gravelly sandy loam
R—27 to 31 inches; bedrock

Minor Components

Rock outcrop
Percentage of map unit: 10 percent
Landform: Hills
Slope range: 50 to 75 percent

Argixerolls
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 20 to 50 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Knuckle soils
Percentage of map unit: 4 percent
Landform: Hills
Slope range: 20 to 50 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Burgundy soils
Percentage of map unit: 4 percent
Landform: Hills
Slope range: 20 to 50 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Casino soils
Percentage of map unit: 2 percent
Landform: Side slopes of hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

105—Chalone-Firstsister-Highpeaks complex, 50 to 70 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 3,360 feet

Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Chalone and similar soils: 35 percent
Firstsister and similar soils: 35 percent
Highpeaks and similar soils: 20 percent
Minor components: 10 percent

Major Components

Chalone

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 35 to 50 percent with coarse subangular gravel, 5 to 15 percent with subangular cobbles, and 5 to 15 percent with subangular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.8 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: California juniper, blue oak, foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, hollyleaf cherry, scrub oak, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, Sandberg bluegrass, soft brome

Typical profile
A1—0 to 3 inches; very gravelly loamy coarse sand
A2—3 to 8 inches; very gravelly coarse sandy loam
Bw—8 to 20 inches; very gravelly coarse sandy loam
R—20 to 33 inches; bedrock

Firstsister

Landform: Colluvial footslopes of hills
Landform position (two-dimensional): Footslopes
Landform position (three-dimensional): Base slopes

Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Colluvium derived from rhyolite

Properties and qualities

Percentage of surface covered with coarse fragments: 0 to 5 percent with coarse subangular gravel and 0 to 75 percent with subangular cobbles
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): High (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.9 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Footslopes & Backslopes 17-19" P.z. (R015XI105CA)
Common trees: California ash, California juniper, California live oak, California sycamore, blue oak
Overstory vegetation: Hollyleaf cherry, California buckeye, buckbrush, scrub oak
Understory vegetation: Pacific poison oak, ripgut brome, Sandberg bluegrass, fringed redmaids, rattail fescue, silver hairgrass, California maidenhair

Typical profile

Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 5 inches; gravelly sandy loam
A2—5 to 22 inches; very gravelly sandy loam
Bw—22 to 59 inches; extremely gravelly sandy loam

Highpeaks

Landform: Convex backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from andesite

Properties and qualities

Percentage of surface covered with coarse fragments: 0 to 15 percent with subangular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic

Available water capacity (entire profile): Very low (about 1.6 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Footslopes & Backslopes 17-19" P.z. (R015XI105CA)
Common trees: Foothill pine
Overstory vegetation: Hollyleaf cherry, buckbrush
Understory vegetation: Rattail fescue, ripgut brome, Sandberg bluegrass, silver hairgrass, California maidenhair

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A1—2 to 5 inches; gravelly coarse sandy loam
A2—5 to 13 inches; very gravelly coarse sandy loam
Cr—13 to 21 inches; bedrock
R—21 to 22 inches; bedrock

Minor Components

Scree
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 50 to 70 percent
Hydric classification: Not hydric

Rock outcrop
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 50 to 70 percent

106—Casino-Argixerolls complex, 50 to 70 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 3,280 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Casino and similar soils: 50 percent
Argixerolls and similar soils: 30 percent
Minor components: 20 percent

Major Components

Casino

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from acidic tuff and/or andesite

Properties and qualities

Percentage of surface covered with coarse fragments: 0 to 30 percent with medium subangular gravel and 0 to 5 percent with subangular stones
Surface feature: Not hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to moderately high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 6.8 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Common trees: Blue oak, foothill pine
Overstory vegetation: Birchleaf mountain mahogany, creeping snowberry
Understory vegetation: Ripgut brome, wild oat, melic, Sandberg bluegrass, rattail fescue, California bedstraw

Typical profile

A1—0 to 4 inches; loam
A2—4 to 10 inches; clay loam
Bt1—10 to 20 inches; clay
Bt2—20 to 37 inches; clay
R—37 to 38 inches; bedrock

Argixerolls

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite, andesite, and/or dacite

Properties and qualities

Percentage of surface covered with coarse fragments: 25 to 35 percent with coarse subangular gravel, 0 to 5 percent with subangular cobbles, and 0 to 5 percent with subangular stones
Surface feature: Moderately hydrophobic
Depth to restrictive feature: 6 to 10 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.3 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Steep, Clayey-Skeletal, South-Facing Slopes 17-19" P.z. (R015XI104CA)
Common trees: Blue oak, foothill pine
Overstory vegetation: California sagebrush, chamise
Understory vegetation: Maltese star-thistle, tussockgrass, rattail fescue, Texas Indian paintbrush, California buckwheat, black sage

Typical profile
A—0 to 2 inches; very gravelly loam
Bt1—2 to 6 inches; extremely gravelly loam
Bt2—6 to 7 inches; extremely gravelly clay loam
R—7 to 11 inches; bedrock

Minor Components

Rock outcrop
Percentage of map unit: 10 percent
Landform: Hills
Slope range: 35 to 70 percent

Casino soils
Percentage of map unit: 7 percent
Landform: Backslopes of hills
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, rarely flooded
Percentage of map unit: 2 percent
Landform: Higher stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 1 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

107—Casino sandy clay loam, 20 to 35 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 3,280 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Casino and similar soils: 70 percent
Minor components: 30 percent

Major Component

Casino

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 20 to 35 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from acidic tuff and/or andesite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 15 percent with coarse subangular gravel
Surface feature: Not hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 5.8 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Common trees: Blue oak, foothill pine
Overstory vegetation: Birchleaf mountain mahogany, creeping snowberry
Understory vegetation: Ripgut brome, wild oat, Sandberg bluegrass, melic, rattail fescue, California bedstraw

Typical profile
A1—0 to 1 inch; sandy clay loam
A2—1 to 7 inches; gravelly sandy clay loam
B/A—7 to 12 inches; gravelly clay loam
Bt1—12 to 21 inches; gravelly clay loam
Bt2—21 to 31 inches; gravelly clay
R—31 to 33 inches; bedrock

Minor Components

Rock outcrop
Percentage of map unit: 10 percent
Landform: Hills
Slope range: 20 to 35 percent

Casino soils
Percentage of map unit: 10 percent
Landform: Backslopes of hills
Slope range: 5 to 20 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Argixerolls
Percentage of map unit: 10 percent
Landform: Hills

Slope range: 15 to 35 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

109—Rock outcrop-Highpeaks-Burgundy complex, 35 to 100 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 3,360 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Rock outcrop: 35 percent
Highpeaks and similar soils: 35 percent
Burgundy and similar soils: 20 percent
Minor components: 10 percent

Major Components

Rock Outcrop

Landform: Hills
Slope range: 50 to 100 percent
Parent material: Residuum derived from rhyolite
Land capability class (nonirrigated): 8

Highpeaks

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 35 percent with coarse subangular gravel and 0 to 35 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.4 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: Foothill pine
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, pointleaf manzanita
Understory vegetation: Silver hairgrass, rattail fescue, orange bush monkeyflower, soft brome

Typical profile

A1—0 to 3 inches; gravelly sandy loam
A2—3 to 8 inches; very gravelly sandy loam
C—8 to 15 inches; very gravelly sandy loam
R—15 to 16 inches; bedrock

Burgundy

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities

Percentage of surface covered with coarse fragments: 35 to 80 percent with fine subangular gravel and 5 to 10 percent with subangular cobbles
Surface features: Moderately hydrophobic; rilled between spikemoss clusters (soil accumulates upslope of spikemoss clusters)
Depth to restrictive feature: 4 to 10 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.4 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
Common trees: Foothill pine
Overstory vegetation: Chamise
Understory vegetation: Bushy spikemoss, California buckwheat, wild oat

Typical profile

A1—0 to 1 inch; extremely gravelly sandy loam
A2—1 to 6 inches; very gravelly sandy loam
R—6 to 8 inches; bedrock

Minor Components

Burgundy soils

Percentage of map unit: 5 percent
Landform: Hills
Slope range: 20 to 35 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, rarely flooded
Percentage of map unit: 4 percent
Landform: Higher stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 1 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

110—Knuckle-Chalone-Burgundy complex, 35 to 70 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,710 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Chalone and similar soils: 35 percent
Knuckle and similar soils: 30 percent
Burgundy and similar soils: 20 percent
Minor components: 15 percent

Major Components

Knuckle

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 20 to 50 percent with coarse angular gravel, 15 to 20 percent with angular cobbles, and 5 to 10 percent with angular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.5 inch)

Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Bushy spikemoss, black sage, California buckwheat, wild oat

Typical profile
A—0 to 3 inches; gravelly sandy loam
Bw1—3 to 12 inches; gravelly loamy sand
Bw2—12 to 17 inches; very gravelly loamy sand
R—17 to 23 inches; bedrock

Chalone

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 35 to 50 percent with coarse subangular gravel, 5 to 15 percent with subangular cobbles, and 5 to 15 percent with subangular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.3 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: Blue oak, foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, hollyleaf cherry, scrub oak, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, Sandberg bluegrass, wild oat, soft brome

Typical profile
Oe—0 to 1 inch; moderately decomposed plant material
Oi—1 to 3 inches; slightly decomposed plant material
A—3 to 8 inches; gravelly sandy loam
Bw1—8 to 12 inches; extremely gravelly sandy clay loam
Bw2—12 to 30 inches; extremely gravelly sandy clay loam
R—30 to 34 inches; bedrock

Burgundy

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 35 to 80 percent with fine subangular gravel and 5 to 10 percent with subangular cobbles
Surface features: Moderately hydrophobic; rilled between spikemoss clusters (soil accumulates upslope of spikemoss clusters)
Depth to restrictive feature: 4 to 10 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.3 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Bushy spikemoss, California buckwheat, wild oat

Typical profile
A1—0 to 2 inches; gravelly sandy loam
A2—2 to 5 inches; extremely gravelly sandy loam
R—5 to 6 inches; bedrock

Minor Components

Rock outcrop
Percentage of map unit: 10 percent
Landform: Hills
Slope range: 35 to 70 percent

Casino soils
Percentage of map unit: 5 percent
Landform: Backslopes of hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

111—Backdoor-Tuborcio complex, 20 to 70 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills

Elevation: 950 to 2,790 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Backdoor sandy loam and similar soils: 35 percent
Backdoor gravelly sandy loam and similar soils: 30 percent
Tuborcio and similar soils: 20 percent
Minor components: 15 percent

Major Components

Backdoor Sandy Loam

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 55 to 65 percent with coarse subrounded gravel
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 5.2 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 5 inches; sandy loam
A2—5 to 10 inches; gravelly loam
Bt1—10 to 15 inches; gravelly clay loam
Bt2—15 to 27 inches; very paragravelly sandy clay loam
Crt—27 to 60 inches; extremely paragravelly loamy coarse sand

Backdoor Gravelly Sandy Loam

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes

Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 55 to 65 percent with coarse subrounded gravel
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 5.5 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: Blue oak, foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, hollyleaf cherry, scrub oak, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, Sandberg bluegrass, soft brome

Typical profile
A—0 to 4 inches; gravelly sandy loam
Bt1—4 to 17 inches; gravelly clay loam
Bt2—17 to 28 inches; very paragravelly sandy clay loam
Crt—28 to 60 inches; extremely paragravelly loamy coarse sand

Tuborcio

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 20 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 20 percent with medium subangular gravel and 0 to 5 percent with subangular cobbles
Surface features: Very slightly hydrophobic
Depth to restrictive feature: 8 to 24 inches to abrupt textural change
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic

Available water capacity (entire profile): Low (about 5.0 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Common trees: Blue oak
Overstory vegetation: Creeping snowberry
Understory vegetation: Soft brome, ripgut brome, rattail fescue, wild oat

Typical profile
A1—0 to 3 inches; gravelly sandy loam
A2—3 to 14 inches; gravelly sandy loam
A3—14 to 21 inches; gravelly sandy loam
Bt1—21 to 28 inches; gravelly sandy clay
Bt2—28 to 33 inches; gravelly sandy clay
Crt—33 to 41 inches; extremely paragravelly sandy clay loam

Minor Components

Backdoor sandy loam
Percentage of map unit: 5 percent
Landform: Backslopes of hills
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Tuborcio soils
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Backdoor gravelly sandy loam
Percentage of map unit: 5 percent
Landform: Backslopes of hills
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

112—Rimtrail sandy loam, 0 to 5 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 490 to 1,640 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Rimtrail and similar soils: 85 percent
Minor components: 15 percent

Major Component

Rimtrail

Landform: Valley flats
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Talfs
Slope range: 0 to 5 percent
Slope aspect: West to north
Parent material: Alluvium derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 15 percent with coarse subrounded gravel
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): High (about 10.1 inches)
Land capability subclass (nonirrigated): 2e
Hydric classification: Not hydric

Vegetation
Ecological site: Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
Common trees: None
Understory vegetation: Soft brome, ripgut brome, wild oat, rattail fescue, redstem filaree

Typical profile
A1—0 to 2 inches; sandy loam
A2—2 to 11 inches; sandy loam
A3—11 to 22 inches; sandy loam
Bt1—22 to 29 inches; sandy clay loam
Bt2—29 to 45 inches; sandy clay loam
Bt3—45 to 59 inches; sandy clay loam

Minor Components

Rimtrail soils
Percentage of map unit: 10 percent
Landform: Valley flats
Slope range: 5 to 9 percent
Slope aspect: North to west
Hydric classification: Not hydric

Backdoor soils
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 9 to 20 percent

Slope aspect: Northwest to northeast
Hydric classification: Not hydric

113—Elder-Oxyaquic Haploxerolls complex, 2 to 5 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 1,310 to 1,640 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Elder and similar soils: 40 percent
Oxyaquic Haploxerolls, rarely flooded, and similar soils: 40 percent
Minor components: 20 percent

Major Components

Elder

Landform: Stream terrace valleys
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 2 to 5 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 15 to 25 percent with coarse subangular gravel
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Annual flooding frequency: Occasional (see Water Features table)
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 5.0 inches)
Land capability subclass (nonirrigated): 3e
Hydric classification: Not hydric

Vegetation
Ecological site: Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
Common trees: None
Understory vegetation: Yellow star-thistle, coast Indian paintbrush, soft brome, Baltic rush, ripgut brome, carex, beardless wildrye, Chilean bird’s-foot trefoil, redstem filaree, blue wildrye

Typical profile
Oi—0 to 0.5 inch; slightly decomposed plant material

A1—0.5 to 3 inches; fine sandy loam
A2—3 to 20 inches; loam
C1—20 to 22 inches; gravelly loamy coarse sand
2C2—22 to 44 inches; very gravelly sandy loam
3C3—44 to 56 inches; extremely gravelly loamy coarse sand

Oxyaquic Haploxerolls, Rarely Flooded

Landform: Stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 2 to 5 percent
Slope aspect: Northeast to southeast
Parent material: Alluvium derived from rhyolite and/or granite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 10 percent with coarse subangular gravel
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: Rare (see Water Features table)
Annual ponding frequency: None
Seasonal high water table minimum depth: About 30 to 39 inches (see Water Features table)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.5 inches)
Land capability subclass (nonirrigated): 3e
Hydric classification: Not hydric

Vegetation
Ecological site: Riparian Areas 17-19" P.z. (R015XI103CA)
Common trees: California live oak, California sycamore, Fremont cottonwood, interior live oak
Overstory vegetation: Arroyo willow, coast Indian paintbrush, coyote willow, mule’s fat
Understory vegetation: Soft brome, wild oat, Pacific poison oak, carex, Douglas sagewort, California blackberry, rush

Typical profile
A1—0 to 2 inches; sandy loam
A2—2 to 11 inches; sandy loam
2A1—11 to 14 inches; very gravelly loamy coarse sand
2A2—14 to 26 inches; gravelly sandy loam
2A3—26 to 33 inches; very gravelly sandy loam
2A4—33 to 37 inches; extremely gravelly coarse sandy loam
2C—37 to 59 inches; extremely cobbly sandy loam

Minor Components

Riverwash
Percentage of map unit: 10 percent
Landform: Channels
Slope range: 0 to 2 percent

Rimtrail soils
Percentage of map unit: 8 percent
Landform: Valley flats

Slope range: 5 to 9 percent
Slope aspect: North to west
Hydric classification: Not hydric

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 2 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

114—Ordeal-Tuborcio-Passion complex, 20 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 950 to 2,410 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Ordeal and similar soils: 40 percent
Tuborcio and similar soils: 35 percent
Passion and similar soils: 15 percent
Minor components: 10 percent

Major Components

Ordeal

Landform: Shoulder slopes of hills
Landform position (two-dimensional): Shoulders
Landform position (three-dimensional): Side slopes
Slope range: 20 to 50 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from sandstone

Properties and qualities
Percentage of surface covered with coarse fragments: 5 to 15 percent with coarse subangular gravel
Surface feature: Moderately hydrophobic
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.1 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation

Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, rattail fescue, common deerweed, soft brome, California buckwheat

Typical profile

A—0 to 13 inches; coarse sandy loam
Bw—13 to 30 inches; very gravelly loamy coarse sand
Cr—30 to 33 inches; bedrock

Tuborcio

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 20 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from granite

Properties and qualities

Percentage of surface covered with coarse fragments: 0 to 20 percent with medium subangular gravel and 0 to 5 percent with subangular cobbles
Surface features: Very slightly hydrophobic
Depth to restrictive feature: 8 to 24 inches to abrupt textural change
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 6.6 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation

Ecological site: Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Common trees: Blue oak
Overstory vegetation: Creeping snowberry
Understory vegetation: Soft brome, ripgut brome, rattail fescue, wild oat

Typical profile

A—0 to 13 inches; coarse sandy loam
Bt1—13 to 17 inches; clay
Bt2—17 to 24 inches; clay
Bt3—24 to 40 inches; clay
Crt—40 to 60 inches; extremely paragravelly sandy clay loam

Passion

Landform: Hills
Landform position (two-dimensional): Backslopes, summits, shoulders
Landform position (three-dimensional): Side slopes
Slope range: 20 to 50 percent

Slope aspect: Southwest to southeast
Parent material: Residuum derived from sandstone

Properties and qualities
Percentage of surface covered with coarse fragments: 15 to 25 percent with coarse subangular gravel and 5 to 15 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.1 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, rattail fescue, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 5 inches; loamy sand
A2—5 to 11 inches; gravelly loamy sand
A3—11 to 17 inches; very gravelly loamy sand
Cr—17 to 21 inches; bedrock

Minor Components

Ordeal soils
Percentage of map unit: 10 percent
Landform: Shoulders of hills
Slope range: 50 to 70 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

115—Tuborcio loam, 2 to 20 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 950 to 2,410 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Tuborcio and similar soils: 80 percent
Minor components: 20 percent

Major Component

Tuborcio

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 2 to 20 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 20 percent with medium subangular gravel and 0 to 5 percent with subangular cobbles
Surface features: Very slightly hydrophobic
Depth to restrictive feature: 4 to 8 inches to abrupt textural change
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 7.5 inches)
Land capability subclass (nonirrigated): 4e
Hydric classification: Not hydric

Vegetation
Ecological site: Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Common trees: Blue oak
Overstory vegetation: Creeping snowberry
Understory vegetation: Soft brome, ripgut brome, rattail fescue, wild oat

Typical profile
A—0 to 4 inches; loam
Bt1—4 to 14 inches; clay
Bt2—14 to 20 inches; clay
Bt3—20 to 29 inches; clay loam
Bt4—29 to 45 inches; clay
Crt—45 to 60 inches; extremely paragravelly sandy clay loam

Minor Components

Ordeal soils
Percentage of map unit: 10 percent
Landform: Toeslopes of hills
Slope range: 2 to 20 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Elder soils
Percentage of map unit: 10 percent
Landform: Stream terrace valleys
Slope range: 0 to 2 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

117—Elder gravelly sandy loam, 0 to 1 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 1,000 to 1,200 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Elder and similar soils: 80 percent
Minor components: 20 percent

Major Component

Elder

Landform: Flood plains
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 1 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from conglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 25 percent with coarse subangular gravel
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.6 inches)
Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
Common trees: None
Understory vegetation: Yellow star-thistle, soft brome, Baltic rush, ripgut brome, carex, beardless wildrye, Chilean bird's-foot trefoil, redstem filaree, blue wildrye

Typical profile
A1—0 to 3 inches; gravelly sandy loam
A2—3 to 12 inches; sandy loam
A3—12 to 24 inches; sandy loam
2C—24 to 33 inches; gravelly loamy coarse sand
3Ab—33 to 36 inches; loam
4C—36 to 43 inches; gravelly loamy coarse sand
5Ab—43 to 45 inches; clay loam
6C—45 to 61 inches; gravelly loamy coarse sand

Minor Components

Still clay
Percentage of map unit: 10 percent
Landform: Concave stream terraces
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Still sandy loam
Percentage of map unit: 5 percent
Landform: Stream terraces
Slope range: 0 to 1 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Riverwash
Percentage of map unit: 4 percent
Landform: Channels
Slope range: 0 to 2 percent

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 1 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

119—Still clay, 0 to 2 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 900 to 1,310 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Still and similar soils: 80 percent
Minor components: 20 percent

Major Component

Still

Landform: Concave stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from volcanic and sedimentary rock

Properties and qualities
Percentage of surface covered with coarse fragments: None noted
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained

Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Sodium adsorption ratio about 2.0
Available water capacity (entire profile): High (about 9.8 inches)
Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
Common trees: California live oak, interior live oak, valley oak
Overstory vegetation: Coyotebrush, mule's fat, coyote willow, arroyo willow, California wildrose
Understory vegetation: Baltic rush, bulrush, soft brome, ripgut brome, carex, beardless wildrye, Chilean bird's-foot trefoil, redstem filaree, yellow star-thistle, blue wildrye

Typical profile
A1—0 to 4 inches; clay
A2—4 to 20 inches; clay
Ab—20 to 35 inches; clay loam
C—35 to 59 inches; loam

Minor Components

Elder soils
Percentage of map unit: 10 percent
Landform: Flood plains
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Still soils
Percentage of map unit: 10 percent
Landform: Stream terraces
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

120—Elder coarse sandy loam, 1 to 3 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 1,000 to 1,200 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Elder and similar soils: 80 percent
Minor components: 20 percent

Major Component

Elder

Landform: Alluvial fans
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 1 to 3 percent
Slope aspect: Northeast to southeast
Parent material: Alluvium derived from conglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 25 percent with medium subangular gravel
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 5.7 inches)
Land capability subclass (nonirrigated): 3e
Hydric classification: Not hydric

Vegetation
Ecological site: Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
Common trees: None
Understory vegetation: Yellow star-thistle, soft brome, coast Indian paintbrush, Baltic rush, ripgut brome, carex, beardless wildrye, Chilean bird's-foot trefoil, redstem filaree, blue wildrye

Typical profile
A1—0 to 3 inches; coarse sandy loam
A2—3 to 24 inches; gravelly sandy loam
C1—24 to 33 inches; gravelly sandy loam
C2—33 to 53 inches; gravelly loamy coarse sand
Ab—53 to 59 inches; loam

Minor Components

Still soils
Percentage of map unit: 10 percent
Landform: Concave stream terraces
Slope range: 0 to 2 percent
Slope aspect: Northwest to southwest
Hydric classification: Not hydric

Still soils
Percentage of map unit: 10 percent
Landform: Stream terraces
Slope range: 0 to 2 percent
Slope aspect: Northwest to southwest
Hydric classification: Not hydric

122—Tuborcio sandy loam, 35 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 950 to 2,410 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Tuborcio and similar soils: 80 percent
Minor components: 20 percent

Major Component

Tuborcio

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 5 to 20 percent with medium subangular gravel and 0 to 5 percent with subangular cobbles
Surface features: Very slightly hydrophobic
Depth to restrictive feature: 8 to 24 inches to abrupt textural change
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): High (about 7.8 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Common trees: Blue oak
Overstory vegetation: Creeping snowberry
Understory vegetation: Soft brome, ripgut brome, rattail fescue, wild oat

Typical profile
A1—0 to 3 inches; sandy loam
A2—3 to 13 inches; sandy clay loam
Bt1—13 to 24 inches; clay
Bt2—24 to 33 inches; clay
Bt3—33 to 49 inches; sandy clay
Crt—49 to 60 inches; extremely paragravelly sandy clay loam

Minor Components

Backdoor soils
Percentage of map unit: 10 percent
Landform: Backslopes of hills
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Tuborcio soils
Percentage of map unit: 5 percent
Landform: Backslopes of hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Tuborcio soils
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 20 to 35 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

123—Teapot-Rock outcrop complex, 35 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,300 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Teapot and similar soils: 60 percent
Rock outcrop: 30 percent
Minor components: 10 percent

Major Components

Teapot

Landform: Side slopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: South to north
Parent material: Residuum derived from mudstone

Properties and qualities
Percentage of surface covered with coarse fragments: 35 to 55 percent with coarse subangular gravel
Surface features: Strongly hydrophobic
Restrictive feature: None within a depth of 60 inches

Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.0 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Diatomaceous Hillslopes 17-19" P.z. (R015XI106CA)
Common trees: None
Overstory vegetation: Scrub oak, chamise, interior live oak, bigberry manzanita
Understory vegetation: Common deerweed

Typical profile
A1—0 to 3 inches; very gravelly loam
A2—3 to 18 inches; extremely gravelly loam
C—18 to 61 inches; extremely gravelly loam

Rock Outcrop

Landform: Hills
Slope range: 35 to 50 percent
Parent material: Residuum derived from mudstone
Land capability class (nonirrigated): 8

Minor Components

Teapot soils
Percentage of map unit: 10 percent
Landform: Side slopes of hills
Slope range: 50 to 70 percent
Slope aspect: South to north
Hydric classification: Not hydric

127—Argixerolls-Rock outcrop-Chalone complex, 35 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,820 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Argixerolls and similar soils: 50 percent
Rock outcrop: 20 percent
Chalone and similar soils: 15 percent
Minor components: 15 percent

Major Components

Argixerolls

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 25 to 35 percent with coarse subangular gravel, 0 to 10 percent with subangular cobbles, and 0 to 10 percent with subangular stones
Surface feature: Moderately hydrophobic
Depth to restrictive feature: 20 to 31 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.0 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
A—0 to 3 inches; gravelly sandy loam
Bt1—3 to 12 inches; very gravelly sandy loam
Bt2—12 to 21 inches; extremely gravelly sandy loam
Bt3—21 to 28 inches; extremely gravelly sandy clay loam
R—28 to 32 inches; bedrock

Rock Outcrop

Landform: Hills
Slope range: 35 to 50 percent
Parent material: Residuum derived from rhyolite
Land capability class (nonirrigated): 8

Chalone

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from rhyolite

Properties and qualities

Percentage of surface covered with coarse fragments: 15 to 35 percent with coarse subangular gravel, 0 to 10 percent with subangular cobbles, and 0 to 10 percent with subangular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.4 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation

Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: Blue oak, foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, hollyleaf cherry, scrub oak, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, Sandberg bluegrass, wild oat, soft brome, California maidenhair, ripgut brome

Typical profile

Oe—0 to 0.5 inch; moderately decomposed plant material
A1—0.5 to 2 inches; loam
A2—2 to 5 inches; loam
Bw—5 to 16 inches; very cobbly loam
Cr—16 to 20 inches; extremely gravelly sandy loam
R—20 to 21 inches; bedrock

Minor Components

Argixerolls

Percentage of map unit: 10 percent
Landform: Hills
Slope range: 15 to 35 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Tuborcio soils

Percentage of map unit: 3 percent
Landform: Hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, rarely flooded

Percentage of map unit: 1 percent
Landform: Higher stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 1 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

128—Still-Riverwash complex, 0 to 2 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 900 to 1,310 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Still and similar soils: 70 percent
Riverwash: 20 percent
Minor components: 10 percent

Major Components

Still

Landform: Stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from volcanic and sedimentary rock

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 5 percent with fine subangular gravel
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Sodium adsorption ratio about 2.0
Available water capacity (entire profile): Very high (about 10.5 inches)
Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Riparian Areas 17-19" P.z. (R015XI103CA)
Common trees: California live oak, interior live oak, valley oak
Overstory vegetation: Coyotebrush, mule’s fat, coyote willow, arroyo willow, California wildrose

Understory vegetation: Baltic rush, beardless wildrye, bulrush, carex, soft brome, ripgut brome, redstem filaree, Chilean bird's-foot trefoil, yellow star-thistle, blue wildrye

Typical profile
Oi—0 to 3 inches; slightly decomposed plant material
A1—3 to 9 inches; loamy coarse sand
A2—9 to 21 inches; gravelly sandy loam
A3—21 to 31 inches; gravelly loam
A4—31 to 38 inches; gravelly coarse sandy loam
A5—38 to 47 inches; clay loam
2Btk1—47 to 59 inches; silty clay loam
Btk2—59 to 65 inches; clay loam

Riverwash

Landform: Channels
Slope range: 0 to 2 percent
Parent material: Alluvium derived from volcanic and sedimentary rock
Land capability subclass (nonirrigated): 8

Minor Components

Still soils
Percentage of map unit: 5 percent
Landform: Riser stream terraces
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Toags soils
Percentage of map unit: 5 percent
Landform: Outwash fan valleys
Slope range: 2 to 9 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

131—Firstsister-Oxyaquic Haploxerolls-Rock outcrop complex, 0 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,460 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Firstsister and similar soils: 50 percent
Oxyaquic Haploxerolls, frequently flooded, and similar soils: 15 percent
Rock outcrop: 15 percent
Minor components: 20 percent

Major Components

Firstsister

Landform: Colluvial footslopes of hills
Landform position (two-dimensional): Footslopes
Landform position (three-dimensional): Base slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Colluvium derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 15 to 35 percent with subangular channers and 0 to 20 percent with subangular stones
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.3 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Riparian Areas 17-19" P.z. (R015XI103CA)
Common trees: California ash, California live oak, California sycamore
Overstory vegetation: Hollyleaf cherry, Pacific poison oak, California buckeye, toyon, creeping snowberry, scrub oak
Understory vegetation: Sandberg bluegrass, ripgut brome, fringed redmaids, silver hairgrass, California maidenhair, orange bush monkeyflower

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A1—2 to 8 inches; extremely channery loam
A2—8 to 35 inches; extremely channery loam
Bw—35 to 59 inches; extremely channery coarse sandy loam

Oxyaquic Haploxerolls, Frequently Flooded

Landform: Lower stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 5 percent
Slope aspect: Northeast to southeast
Parent material: Alluvium derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 15 percent with coarse subangular gravel and 15 to 35 percent with subangular cobbles
Surface feature: Moderately hydrophobic

Restrictive feature: None within a depth of 60 inches
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Annual flooding frequency: Frequent (see Water Features table)
Annual ponding frequency: None
Seasonal high water table minimum depth: About 30 to 39 inches (see Water Features table)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.4 inches)
Land capability subclass (nonirrigated): 3w
Hydric classification: Hydric

Vegetation
Ecological site: Riparian Areas 17-19" P.z. (R015XI103CA)
Common trees: California sycamore, Fremont cottonwood, interior live oak
Overstory vegetation: Arroyo willow, coyote willow, coast Indian paintbrush, mule’s fat
Understory vegetation: Soft brome, wild oat, carex, Pacific poison oak, rush, California blackberry, Douglas sagewort

Typical profile
Oi—0 to 4 inch; slightly decomposed plant material
A—4 to 8 inches; fine sandy loam
C1—8 to 35 inches; sandy loam
2C2—35 to 67 inches; extremely gravelly loamy coarse sand

Rock Outcrop

Landform: Hills
Slope range: 35 to 50 percent
Parent material: Residuum derived from rhyolite
Land capability class (nonirrigated): 8

Minor Components

Firstsister soils
Percentage of map unit: 15 percent
Landform: Colluvial footslopes of hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Highpeaks soils
Percentage of map unit: 4 percent
Landform: Backslopes of hills
Slope range: 35 to 50 percent
Slope aspect: North
Hydric classification: Not hydric

Oxyaquic Haploxerolls, rarely flooded
Percentage of map unit: 1 percent
Landform: Higher stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

132—Toags-Oxyaquic Haploxerolls-Riverwash complex, 0 to 2 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 660 to 1,640 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Toags and similar soils: 50 percent
Oxyaquic Haploxerolls, rarely flooded, and similar soils: 20 percent
Riverwash: 15 percent
Minor components: 15 percent

Major Components

Toags

Landform: Bars, flood plains
Slope range: 0 to 2 percent
Slope aspect: Southwest
Parent material: Alluvium derived from volcanic and sedimentary rock

Properties and qualities
Percentage of surface covered with coarse fragments: 10 to 55 percent with coarse subangular gravel and 0 to 10 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.7 inches)
Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Upper Stream Terraces 17-19" P.z. (R015XI107CA)
Common trees: California live oak, foothill pine, interior live oak
Overstory vegetation: Chamise
Understory vegetation: Ripgut brome, soft brome, Spanish brome, rattail fescue, smooth catsear, California ragwort, redstem filaree, California bedstraw, California buckwheat

Typical profile
A1—0 to 3 inches; coarse sand
A2—3 to 7 inches; coarse sand
C1—7 to 24 inches; coarse sand

C2—24 to 38 inches; coarse sand
C3—38 to 60 inches; coarse sand

Oxyaquic Haploxerolls, Rarely Flooded

Landform: Higher stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 2 percent
Slope aspect: Southwest
Parent material: Alluvium derived from granite and/or rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 35 to 50 percent with coarse subrounded gravel
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: Rare (see Water Features table)
Annual ponding frequency: None
Seasonal high water table minimum depth: About 30 to 39 inches (see Water Features table)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.5 inches)
Land capability subclass (nonirrigated): 6w
Hydric classification: Not hydric

Vegetation
Ecological site: Riparian Areas 17-19" P.z. (R015XI103CA)
Common trees: California sycamore, Fremont cottonwood, interior live oak
Overstory vegetation: Coast Indian paintbrush, coyote willow, arroyo willow, mule's fat
Understory vegetation: Soft brome, wild oat, carex, Pacific poison oak, rush, Douglas sagewort, California blackberry

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 5 inches; gravelly loamy coarse sand
2C1—5 to 19 inches; extremely gravelly loamy coarse sand
3Ab—19 to 24 inches; fine sandy loam
4C2—24 to 26 inches; sand
4C3—26 to 51 inches; sand

Riverwash

Landform: Channels
Slope range: 0 to 2 percent
Slope aspect: Southwest
Parent material: Alluvium derived from volcanic and sedimentary rock
Land capability subclass (nonirrigated): 8

Minor Components

Toags soils
Percentage of map unit: 5 percent
Landform: Outwash fan valleys
Slope range: 0 to 2 percent

Slope aspect: Southwest
Hydric classification: Not hydric

Gravel bars
Percentage of map unit: 5 percent
Landform: Channels
Slope range: 0 to 2 percent
Slope aspect: Southwest
Hydric classification: Not hydric

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 5 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

133—Toags-Pinncamp complex, 0 to 5 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 980 to 1,640 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Toags and similar soils: 50 percent
Pinncamp and similar soils: 30 percent
Minor components: 20 percent

Major Components

Toags

Landform: High stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from fanglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 10 to 55 percent with coarse subangular gravel
Surface feature: Slightly hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.1 inches)

Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Upper Stream Terraces 17-19" P.z. (R015XI107CA)
Common trees: California live oak, foothill pine, interior live oak
Overstory vegetation: Silver lupine, chamise
Understory vegetation: Ripgut brome, soft brome, Spanish brome, smooth catsear, rattail fescue, redstem filaree, California ragwort, California bedstraw, California buckwheat

Typical profile
A1—0 to 7 inches; gravelly coarse sand
A2—7 to 24 inches; gravelly coarse sand
C1—24 to 42 inches; gravelly coarse sand
C2—42 to 60 inches; gravelly coarse sand

Pinncamp

Landform: High stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from conglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 10 percent with subangular cobbles
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.4 inches)
Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Quercus Lobata-Quercus Wislizeni/Carex Barbarae (F015XI201CA)
Common trees: Foothill pine, interior live oak, valley oak
Understory vegetation: Santa Barbara sedge, ripgut brome, soft brome, California bedstraw

Typical profile
Oi—0 to 2 inch; slightly decomposed plant material
Oe—2 to 4 inches; moderately decomposed plant material
A1—4 to 12 inches; gravelly coarse sand
A2—12 to 22 inches; gravelly loamy coarse sand
A3—22 to 36 inches; loamy coarse sand
C—36 to 64 inches; loamy coarse sand

Minor Components

Riverwash
Percentage of map unit: 10 percent
Landform: Channels
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast

Still soils
Percentage of map unit: 5 percent
Landform: Stream terraces
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, rarely flooded
Percentage of map unit: 3 percent
Landform: Higher stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 2 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

134—Toags gravelly coarse sand, 2 to 9 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 980 to 1,640 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Toags and similar soils: 70 percent
Minor components: 30 percent

Major Component

Toags

Landform: Outwash fans
Slope range: 2 to 9 percent
Slope aspect: Southeast to northeast
Parent material: Alluvium derived from fanglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 10 to 55 percent with coarse subangular gravel, 0 to 10 percent with subangular cobbles, and 0 to 10 percent with subangular stones

Surface feature: Slightly hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): Very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.8 inches)
Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Upper Stream Terraces 17-19" P.z. (R015XI107CA)
Common trees: None
Overstory vegetation: Silver lupine, chamise
Understory vegetation: Soft brome, Spanish brome, redstem filaree, California ragwort, California buckwheat, common deerweed

Typical profile
A—0 to 5 inches; gravelly coarse sand
C—5 to 61 inches; gravelly coarse sand

Minor Components

Oxyaquic Haploxerolls, rarely flooded
Percentage of map unit: 10 percent
Landform: Stream terraces
Slope range: 2 to 9 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Toags soils
Percentage of map unit: 10 percent
Landform: Outwash fan valleys
Slope range: 2 to 9 percent
Slope aspect: Southeast to northeast
Hydric classification: Not hydric

Toags soils
Percentage of map unit: 10 percent
Landform: Outwash fan valleys
Slope range: 9 to 30 percent
Slope aspect: Southeast to northeast
Hydric classification: Not hydric

135—Toags-Riverwash complex, 0 to 9 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 980 to 1,640 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Toags and similar soils: 50 percent
Riverwash: 35 percent
Minor components: 15 percent

Major Components

Toags

Landform: Bars
Slope range: 2 to 9 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from conglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 10 to 55 percent with coarse subangular gravel and 0 to 10 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.1 inches)
Land capability subclass (nonirrigated): 3s
Hydric classification: Not hydric

Vegetation
Ecological site: Upper Stream Terraces 17-19" P.z. (R015XI107CA)
Common trees: California live oak, foothill pine, interior live oak
Overstory vegetation: Chamise
Understory vegetation: Ripgut brome, soft brome, Spanish brome, rattail fescue, smooth catsear, California ragwort, redstem filaree, California bedstraw, California buckwheat

Typical profile
A1—0 to 7 inches; gravelly loamy sand
A2—7 to 24 inches; gravelly loamy sand
C1—24 to 42 inches; gravelly loamy sand
C2—42 to 60 inches; gravelly loamy sand

Riverwash

Landform: Channels
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Parent material: Alluvium derived from volcanic and sedimentary rock
Land capability subclass (nonirrigated): 8

Minor Components

Oxyaquic Haploxerolls, rarely flooded
Percentage of map unit: 10 percent
Landform: Higher stream terraces
Slope range: 0 to 5 percent

Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Oxyaquic Haploxerolls, frequently flooded
Percentage of map unit: 5 percent
Landform: Lower stream terraces
Slope range: 0 to 5 percent
Slope aspect: Southwest to southeast
Hydric classification: Hydric

136—Oxyaquic Haploxerolls, 0 to 1 percent slopes

Map Unit Setting

Major land resource area: Central California Coastal Valleys
Landform: River valleys
Elevation: 980 to 1,310 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Oxyaquic Haploxerolls, ponded, and similar soils: 90 percent
Minor components: 10 percent

Major Component

Oxyaquic Haploxerolls, Ponded

Landform: Stream terraces
Landform position (two-dimensional): Toeslopes
Landform position (three-dimensional): Treads
Slope range: 0 to 1 percent
Slope aspect: Southeast to northeast
Parent material: Alluvium derived from granite and/or rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: None noted
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: Frequent (see Water Features table)
Seasonal high water table minimum depth: About 0 to 6 inches (see Water Features table)
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): High (about 8.8 inches)
Land capability subclass (nonirrigated): 4w
Hydric classification: Hydric

Vegetation
Ecological site: Riparian Areas 17-19" P.z. (R015XI103CA)
Common trees: California sycamore, Fremont cottonwood, interior live oak
Overstory vegetation: Coyote willow, arroyo willow, coast Indian paintbrush, mule’s fat

Understory vegetation: Wild oat, soft brome, carex, Pacific poison oak, Douglas sagewort, California blackberry, rush

Typical profile
A1—0 to 4 inches; clay
A2—4 to 20 inches; clay
C1—20 to 35 inches; gravelly sandy clay loam
2Ab—35 to 47 inches; clay loam
3C2—47 to 49 inches; coarse sandy loam
4C3—49 to 59 inches; loam

Minor Components

Elder soils
Percentage of map unit: 5 percent
Landform: Stream terrace valleys
Slope range: 0 to 1 percent
Slope aspect: Southeast to northeast
Hydric classification: Not hydric

Still soils
Percentage of map unit: 5 percent
Landform: Concave stream terraces
Slope range: 0 to 2 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

138—Rock outcrop-Highpeaks-Chalone complex, 35 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 3,360 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Rock outcrop: 40 percent
Highpeaks and similar soils: 30 percent
Chalone and similar soils: 15 percent
Minor components: 15 percent

Major Components

Rock Outcrop

Landform: Hills
Slope range: 35 to 50 percent
Parent material: Residuum derived from rhyolite
Land capability class (nonirrigated): 8

Highpeaks

Landform: Convex backslopes of hills
Landform position (two-dimensional): Backslopes

Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: East to west
Parent material: Residuum derived from acidic volcanic breccia

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 35 percent with coarse subangular gravel, 0 to 35 percent with subangular cobbles, 0 to 15 percent with subangular stones, and 0 to 10 percent with subangular boulders
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.4 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: Foothill pine
Overstory vegetation: Chamise, bigberry manzanita, buckbrush, pointleaf manzanita
Understory vegetation: Silver hairgrass, rattail fescue, soft brome, California maidenhair

Typical profile
A1—0 to 4 inches; very gravelly loam
A2—4 to 11 inches; very gravelly loam
A3—11 to 15 inches; very gravelly loam
R—15 to 16 inches; bedrock

Chalone

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from acidic volcanic breccia

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 10 percent with coarse subangular gravel, 0 to 5 percent with subangular cobbles, and 0 to 5 percent with subangular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None

Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.2 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: California ash, blue oak, foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, hollyleaf cherry, scrub oak, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, Sandberg bluegrass, wild oat, soft brome, California maidenhair

Typical profile
A1—0 to 4 inches; gravelly loam
A2—4 to 13 inches; very gravelly loam
Bw—13 to 24 inches; extremely gravelly sandy loam
R—24 to 28 inches; bedrock

Minor Components

Argixerolls
Percentage of map unit: 10 percent
Landform: Hills
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Highpeaks soils
Percentage of map unit: 5 percent
Landform: Convex backslopes of hills
Slope range: 50 to 70 percent
Slope aspect: East to west
Hydric classification: Not hydric

139—Highpeaks-Rock outcrop complex, 35 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 3,360 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Highpeaks and similar soils: 75 percent
Rock outcrop: 15 percent
Minor components: 10 percent

Major Components

Highpeaks

Landform: Convex backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: North
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 35 percent with coarse subangular gravel
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.3 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: Foothill pine
Overstory vegetation: Chamise, bigberry manzanita, buckbrush, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, soft brome, California maidenhair

Typical profile
A1—0 to 3 inches; gravelly sandy loam
A2—3 to 10 inches; gravelly loam
A3—10 to 15 inches; extremely gravelly loam
R—15 to 16 inches; bedrock

Rock Outcrop

Landform: Hills
Slope range: 35 to 50 percent
Parent material: Residuum derived from rhyolite
Land capability class (nonirrigated): 8

Minor Components

Chalone soils
Percentage of map unit: 10 percent
Landform: Backslopes of hills
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

142—Ordeal-Longsfolly-Passion complex, 9 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 950 to 2,410 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Ordeal and similar soils: 40 percent
Longsfolly and similar soils: 35 percent
Passion and similar soils: 15 percent
Minor components: 10 percent

Major Components

Ordeal

Landform: Backslopes of hills
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from fanglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 5 to 15 percent with coarse subangular gravel
Surface feature: Moderately hydrophobic
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.2 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, rattail fescue, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 6 inches; loamy sand
A2—6 to 14 inches; loamy sand
C1—14 to 23 inches; gravelly loamy sand

C2—23 to 36 inches; extremely gravelly loamy sand
Cr—36 to 40 inches; bedrock

Longsfolly

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from fanglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 10 percent with coarse subangular gravel and 0 to 10 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.7 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: Foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush
Understory vegetation: Silver hairgrass, Sandberg bluegrass, goldback fern, rattail fescue, soft brome

Typical profile
A1—0 to 4 inches; loamy sand
A2—4 to 16 inches; loamy sand
C1—16 to 28 inches; gravelly loamy coarse sand
C2—28 to 50 inches; gravelly loamy sand
Cr—50 to 63 inches; bedrock

Passion

Landform: Hills
Landform position (two-dimensional): Backslopes, shoulders, summits
Landform position (three-dimensional): Side slopes
Slope range: 9 to 35 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from fanglomerate

Properties and qualities
Percentage of surface covered with coarse fragments: 15 to 25 percent with coarse subangular gravel and 5 to 15 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained

Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.1 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, rattail fescue, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 3 inches; gravelly loamy sand
A2—3 to 7 inches; gravelly loamy sand
C—7 to 16 inches; very gravelly loamy sand
Cr—16 to 61 inches; very gravelly loamy sand

Minor Components

Longsfolly soils
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Longsfolly soils
Percentage of map unit: 3 percent
Landform: Hills
Slope range: 20 to 35 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Toags soils
Percentage of map unit: 2 percent
Landform: Outwash fan valleys
Slope range: 2 to 9 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

146—Badlands

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,300 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Badlands: 90 percent
Minor components: 10 percent

Major Component

Badlands

Landform: Scarps of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 70 to 200 percent
Parent material: Residuum derived from fanglomerate
Land capability class (nonirrigated): 8

Minor Components

Ordeal soils
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 50 to 75 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Longsfolly soils
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

148—Backdoor-Tuborcio complex, 35 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 950 to 2,790 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Backdoor and similar soils: 55 percent
Tuborcio and similar soils: 30 percent
Minor components: 15 percent

Major Components

Backdoor

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Nose slopes
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from granite

Properties and qualities

Percentage of surface covered with coarse fragments: 0 to 15 percent with coarse subrounded gravel
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 5.2 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation

Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile

A1—0 to 5 inches; loam
A2—5 to 10 inches; gravelly loam
Bt1—10 to 15 inches; gravelly clay loam
Bt2—15 to 27 inches; very paragravelly sandy clay loam
Crt—27 to 60 inches; extremely paragravelly loamy coarse sand

Tuborcio

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from granite

Properties and qualities

Percentage of surface covered with coarse fragments: 0 to 20 percent with medium subangular gravel and 0 to 5 percent with subangular cobbles
Surface features: Very slightly hydrophobic
Depth to restrictive feature: 8 to 24 inches to abrupt textural change
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): High (about 8.3 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Common trees: Blue oak
Overstory vegetation: Creeping snowberry
Understory vegetation: Soft brome, ripgut brome, rattail fescue, wild oat

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 2 inches; sandy loam
A2—2 to 8 inches; sandy loam
Bt1—8 to 13 inches; sandy clay
Bt2—13 to 28 inches; sandy clay
Bt3—28 to 50 inches; sandy clay
Crt—50 to 60 inches; extremely paragravelly sandy clay loam

Minor Components

Rock outcrop
Percentage of map unit: 10 percent
Landform: Hills
Slope range: 9 to 35 percent

Argixerolls
Percentage of map unit: 4 percent
Landform: Hills
Slope range: 9 to 35 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Backdoor soils
Percentage of map unit: 1 percent
Landform: Hills
Slope range: 20 to 35 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

152—Backdoor sandy loam, 9 to 20 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,790 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Backdoor and similar soils: 85 percent
Minor components: 15 percent

Major Component

Backdoor

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes

Slope range: 9 to 20 percent
Slope aspect: Southwest to northwest
Parent material: Residuum derived from granite

Properties and qualities
Percentage of surface covered with coarse fragments: 15 to 50 percent with fine subrounded gravel and 15 to 50 percent with medium subrounded gravel
Surface feature: Moderately hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Moderate (about 5.4 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 2 inches; sandy loam
A2—2 to 6 inches; sandy loam
Bt1—6 to 11 inches; sandy clay loam
Bt2—11 to 22 inches; gravelly sandy clay loam
Bt3—22 to 27 inches; very paragravelly sandy clay
Crt—27 to 60 inches; extremely paragravelly loamy coarse sand

Minor Components

Rimtrail soils
Percentage of map unit: 15 percent
Landform: Valley flats
Slope range: 0 to 5 percent
Slope aspect: North to west
Hydric classification: Not hydric

155—Chalone-Knuckle-Rock outcrop complex, 35 to 50 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 980 to 2,710 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Chalone and similar soils: 40 percent
Knuckle and similar soils: 35 percent
Rock outcrop: 15 percent
Minor components: 10 percent

Major Components

Chalone

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 35 to 60 percent with coarse subangular gravel, 15 to 35 percent with subangular cobbles, and 0 to 5 percent with subangular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 2.1 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: California ash, blue oak, foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, hollyleaf cherry, scrub oak, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, Sandberg bluegrass, wild oat, soft brome

Typical profile
A1—0 to 3 inches; very gravelly sandy loam
A2—3 to 8 inches; very gravelly sandy loam
Bw1—8 to 20 inches; very gravelly coarse sandy loam
Bw2—20 to 23 inches; gravelly sandy clay loam
R—23 to 24 inches; bedrock

Knuckle

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 35 to 50 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities

Percentage of surface covered with coarse fragments: 20 to 50 percent with coarse angular gravel
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 6 to 10 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.5 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Bushy spikemoss, black sage, wild oat, California buckwheat

Typical profile

Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 4 inches; gravelly sandy loam
A2—4 to 7 inches; very gravelly loamy sand
R—7 to 8 inches; bedrock

Rock Outcrop

Landform: Hills
Slope range: 35 to 50 percent
Parent material: Residuum derived from rhyolite
Land capability class (nonirrigated): 8

Minor Components

Chalone soils

Percentage of map unit: 5 percent
Landform: Backslopes of hills
Slope range: 2 to 35 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

Firstsister soils

Percentage of map unit: 5 percent
Landform: Colluvial footslopes of hills
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

156—Chalone-Knuckle-Firstsister complex, 50 to 70 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills

Elevation: 980 to 2,710 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Chalone and similar soils: 45 percent
Knuckle and similar soils: 25 percent
Firstsister and similar soils: 15 percent
Minor components: 15 percent

Major Components

Chalone

Landform: Backslopes of hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from rhyolite

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 10 percent with coarse subangular gravel and 5 to 15 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 4.6 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Common trees: California ash, blue oak, foothill pine, interior live oak
Overstory vegetation: Chamise, buckbrush, bigberry manzanita, hollyleaf cherry, scrub oak, pointleaf manzanita
Understory vegetation: Rattail fescue, silver hairgrass, Sandberg bluegrass, soft brome

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 4 inches; loam
A2—4 to 13 inches; gravelly loam
Bw1—13 to 22 inches; extremely gravelly sandy loam
Bw2—22 to 38 inches; very gravelly sandy loam
R—38 to 41 inches; bedrock

Knuckle

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 50 to 70 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from rhyolite

Properties and qualities

Percentage of surface covered with coarse fragments: 20 to 50 percent with coarse angular gravel, 15 to 20 percent with angular cobbles, and 5 to 10 percent with angular stones
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 0.4 inch)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None

Typical profile

A—0 to 2 inches; loamy sand
Bw—2 to 8 inches; very gravelly loamy sand
C—8 to 12 inches; extremely stony loamy sand
R—12 to 23 inches; bedrock

Firstsister

Landform: Colluvial footslopes of hills
Landform position (two-dimensional): Footslopes
Landform position (three-dimensional): Base slopes
Slope range: 50 to 70 percent
Slope aspect: Northwest to northeast
Parent material: Colluvium derived from rhyolite

Properties and qualities

Percentage of surface covered with coarse fragments: 55 to 80 percent with coarse subangular gravel and 0 to 5 percent with subangular cobbles
Surface feature: Not hydrophobic
Restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): High (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches

Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.6 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Footslopes & Backslopes 17-19" P.z. (R015XI105CA)
Common trees: California ash, California juniper, California live oak, California sycamore, blue oak

Typical profile
A—0 to 4 inches; extremely gravelly sandy loam
Bw1—4 to 31 inches; extremely gravelly sandy loam
Bw2—31 to 59 inches; extremely gravelly sandy loam

Minor Components

Rock outcrop
Percentage of map unit: 8 percent
Landform: Hills
Slope range: 50 to 70 percent

Chalone soils
Percentage of map unit: 7 percent
Landform: Backslopes of hills
Slope range: 2 to 35 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

PgE—Pinnacles coarse sandy loam, 5 to 30 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 1,000 to 3,000 feet
Mean annual precipitation: 10 to 17 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 250 days

Map Unit Composition

Pinnacles and similar soils: 85 percent
Minor components: 15 percent

Major Component

Pinnacles

Landform: Dissected terraces
Landform position (two-dimensional): Footslopes
Landform position (three-dimensional): Treads
Slope range: 5 to 30 percent
Slope aspect: Southwest to southeast
Parent material: Consolidated gravelly coarse-loamy alluvium derived from igneous rock

Properties and qualities
Percentage of surface covered with coarse fragments: None noted
Surface feature: Slightly hydrophobic
Depth to restrictive features: 10 to 20 inches to abrupt textural change; 25 to 39 inches to paralithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.3 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
Ap1—0 to 4 inches; coarse sandy loam
Ap2—4 to 10 inches; gravelly sandy loam
AB—10 to 17 inches; gravelly sandy loam
Bt1—17 to 23 inches; gravelly clay loam
Bt2—23 to 30 inches; gravelly clay
Cr—30 to 36 inches; bedrock

Minor Components

Other soils
Percentage of map unit: 13 percent
Landform: Hills
Slope range: 5 to 50 percent
Slope aspect: All
Hydric classification: Not hydric

Pinnacles soils
Percentage of map unit: 2 percent
Landform: Dissected terraces
Slope range: 30 to 75 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

PhG2—Pinnacles stony sandy loam, 30 to 75 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 1,000 to 3,000 feet
Mean annual precipitation: 10 to 16 inches

Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 250 days

Map Unit Composition

Pinnacles and similar soils: 50 percent
Minor components: 50 percent

Major Component

Pinnacles

Landform: Escarpments, terraces
Landform position (two-dimensional): Footslopes
Landform position (three-dimensional): Treads
Slope range: 30 to 75 percent
Slope aspect: Southwest to southeast
Parent material: Consolidated gravelly coarse-loamy alluvium derived from igneous rock

Properties and qualities
Percentage of surface covered with coarse fragments: None noted
Surface feature: Slightly hydrophobic
Depth to restrictive features: 10 to 20 inches to abrupt textural change; 25 to 39 inches to paralithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: About 1.0 millimho per centimeter
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.3 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 4 inches; stony sandy loam
A2—4 to 10 inches; gravelly sandy loam
A3—10 to 17 inches; gravelly sandy loam
Bt1—17 to 23 inches; gravelly clay loam
Bt2—23 to 30 inches; gravelly clay
Cr—30 to 36 inches; bedrock

Minor Components

Other soils
Percentage of map unit: 40 percent
Landform: Hills
Slope range: 30 to 75 percent
Slope aspect: All
Hydric classification: Not hydric

Rock outcrop
Percentage of map unit: 5 percent
Landform: Hills
Slope range: 30 to 75 percent

Pinnacles soils
Percentage of map unit: 5 percent
Landform: Dissected terraces
Slope range: 5 to 30 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

PnE2—Pinnacles coarse sandy loam, 15 to 30 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 1,000 to 3,000 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 250 days

Map Unit Composition

Pinnacles and similar soils: 85 percent
Minor components: 15 percent

Major Component

Pinnacles

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 15 to 30 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from sandstone

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 5 percent with coarse subangular gravel and 0 to 20 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Depth to restrictive features: 10 to 20 inches to abrupt textural change; 25 to 39 inches to paralithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.3 inches)
Land capability subclass (nonirrigated): 6e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 8 inches; coarse sandy loam
A2—8 to 12 inches; coarse sandy loam
Bt—12 to 25 inches; sandy clay
Cr—25 to 60 inches; weathered bedrock

Minor Components

Other soils
Percentage of map unit: 11 percent
Landform: Hills, mountains
Slope range: 15 to 30 percent
Slope aspect: All
Hydric classification: Not hydric

Santa Lucia soils
Percentage of map unit: 4 percent
Landform: Hills
Slope range: 15 to 30 percent
Slope aspect: Northwest to northeast
Hydric classification: Not hydric

PnG3—Pinnacles coarse sandy loam, 30 to 75 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 1,000 to 3,000 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 190 to 250 days

Map Unit Composition

Pinnacles and similar soils: 85 percent
Minor components: 15 percent

Major Component

Pinnacles

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 30 to 75 percent
Slope aspect: Southwest to southeast
Parent material: Residuum derived from sandstone

Properties and qualities

Percentage of surface covered with coarse fragments: 0 to 5 percent with coarse subangular gravel and 0 to 20 percent with subangular cobbles
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 10 to 20 inches to abrupt textural change; 25 to 39 inches to paralithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Low (about 3.3 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation

Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile

A1—0 to 8 inches; coarse sandy loam
A2—8 to 12 inches; coarse sandy loam
Bt—12 to 25 inches; sandy clay
Cr—25 to 60 inches; weathered bedrock

Minor Components

Other soils

Percentage of map unit: 10 percent
Landform: Escarpments, hills, mountains
Slope range: 30 to 75 percent
Slope aspect: All
Hydric classification: Not hydric

Landslides

Percentage of map unit: 5 percent
Landform: Escarpments
Slope range: 30 to 75 percent
Hydric classification: Not hydric

SdG3—Santa Lucia channery loam, 30 to 75 percent slopes

Map Unit Setting

Major land resource area: Central California Coast Range
Landform: Hills
Elevation: 1,200 to 2,000 feet

Mean annual precipitation: 12 to 19 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 190 to 250 days

Map Unit Composition

Santa Lucia and similar soils: 85 percent
Minor components: 15 percent

Major Component

Santa Lucia

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Slope range: 30 to 75 percent
Slope aspect: Northwest to northeast
Parent material: Residuum derived from shale

Properties and qualities
Percentage of surface covered with coarse fragments: 0 to 15 percent with subangular channers
Surface feature: Slightly hydrophobic
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Annual flooding frequency: None
Annual ponding frequency: None
Seasonal high water table minimum depth: More than 72 inches
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Available water capacity (entire profile): Very low (about 1.8 inches)
Land capability subclass (nonirrigated): 7e
Hydric classification: Not hydric

Vegetation
Ecological site: Hills, South-Facing 17-19" P.z. (R015XI100CA)
Common trees: None
Overstory vegetation: Chamise
Understory vegetation: Red brome, common deerweed, soft brome, California buckwheat

Typical profile
A1—0 to 4 inches; channery loam
A2—4 to 14 inches; very parachannery loam
R—14 to 18 inches; unweathered bedrock

Minor Components

Other soils
Percentage of map unit: 9 percent
Landform: Mountains, hills
Slope range: 30 to 75 percent
Slope aspect: All
Hydric classification: Not hydric

Pinnacles soils
Percentage of map unit: 3 percent
Landform: Hills

Slope range: 30 to 75 percent
Slope aspect: Southwest to southeast
Hydric classification: Not hydric

Rock outcrop
Percentage of map unit: 3 percent
Landform: Hills
Slope range: 30 to 75 percent

Note:

Descriptions for detailed soil map units SkG3—Sheridan coarse sandy loam, 30 to 75 percent slopes, severely eroded, and Water are not included in this publication. This information is available through Web Soil Survey at http://soils.usda.gov/survey.

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 as rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

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

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

General Information about the Soils

Table 5 provides general information about each of the soils in the survey area, including precipitation, landscape, parent material, and ecological site.

The *mean annual precipitation* is an average of the total annual liquid precipitation over a standard period of 30 years.

Landscape is a group of spatially related, natural landforms in a relatively large area. The landscape is the land surface that the eye can comprehend in a single view.

Landform is any recognizable physical form or feature on the earth's surface that has characteristic shape and composition and is produced by natural causes. A landform can cover a large area.

Parent material is the unconsolidated and more or less chemically weathered mineral or organic material from which a soil forms.

An *ecological site* is an area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community.

Interpretive Ratings

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

Rating Class Terms

In some of the tables, rating classes are expressed in terms that indicate the suitability of the soils for the use. Thus, the tables may show suitability classes. The suitability ratings are expressed as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Rangeland

By Kendra Moseley, rangeland management specialist, Natural Resources Conservation Service.

Rangeland, sometimes referred to as “wildland,” has native vegetation consisting of grasses, grasslike plants, forbs, shrubs, and trees with a total canopy cover of less than 25 percent. Essentially, rangeland is the interface between areas of cropland and forestland. The vegetation in areas of rangeland provides many habitat components, aids in controlling soil erosion, may be suitable for grazing or browsing by wildlife and domestic animals, and offers scenic and recreational opportunities. Rangeland is important environmentally and economically.

Land Use History

Native Americans intermittently inhabited the hills and valleys around the Pinnacles area. The valley flats, riparian areas, and areas of chaparral and oak woodland provided numerous shrubs, grasses, forbs, sedges, and rushes. These areas were used as a source of food and water and for various cultural traditions and were used by wildlife. The Chalone and Mutsun Tribes, local subgroups of the Costanoans, are believed to have frequented the area. The acorns from the blue oak, interior live oak, California live oak, and valley oak (*Quercus spp.*) provided a major food source along with rabbits, deer, elk, antelope, and possibly fish in the area.

Fires are widely accepted as a natural part of chaparral ecosystems, and much of Pinnacles National Monument supports dominantly chamise and mixed chaparral plant communities that are affected by fire. Most chaparral species are able to recover rapidly after fire, either as a result of vegetative resprouting or the presence of seeds that require hot fires to stimulate germination (Christensen and Muller, 1975; Odion and Davis, 2000; Keeley, 1992a; Keeley, 1992b; McMurray, 1990). These chaparral communities are generally only briefly affected by fires, and in many cases are resprouting or germinating the next year. Once the chaparral stands become extremely dense, the understory herbaceous species all but disappear, most wildlife are not able to pass through them, and some chaparral species are not able to germinate and become established because of the shading and competition from the established shrubs. Fires generate openings that allow herbaceous species to become established, provide corridors and forage for wildlife, and recharge the chaparral species.

The Pinnacles National Monument area has also been used for livestock grazing, primarily in the valley flats on the east side. Grazing no longer occurs in this area nor on the previously grazed land that was acquired recently by the National Park Service. The removal of grazing has inadvertently resulted in the introduction of many annual grasses and invasive plant species into the area, and many of the valley flats now dominantly support these annual grasses and invasive species. The National Park Service is actively working to eradicate the exotic species, and in 1999 it implemented an integrated pest management plan to rid the area of yellow star-thistle (*Centaurea solstitialis*) and shortpod mustard (*Hirschfeldia incana*).

Wild hogs (*Sus scrofa*) in the area also have contributed to the invasion of non-native or invasive species. Wild hogs are not native to this area, and they consume an abundance of plant matter, including the roots and bulbs of many of the native forbs. They root into the soil and dig up the topsoil, leaving the disturbed soil vulnerable to wind and water erosion and to adaptable, quick-growing invasive plants. A fence has been installed that is designed to keep the wild hogs out of the monument area while allowing access by other wildlife.

The dam on Bear Creek that forms Bear Gulch Reservoir, which was constructed by the Civilian Conservation Corps, has altered the hydrology of Bear Creek, reducing the number of natural flood events. This has reduced the capacity of cottonwoods, willows, sycamores, valley oak, sedges, and rushes to regenerate and has shifted some sections of Bear Creek to a more upland-dominated system (www.nps.gov/pinn).

Valley oak (*Quercus Lobata*) woodland is a rapidly disappearing ecosystem in California. Although valley oak is in the Pinnacles National Monument area, many of the trees are more than 100 years old and are no longer regenerating. Valley oak is most common on the higher flood plains along rivers and streams, and it commonly is associated with riparian forests that support dominantly Fremont's cottonwood (*Populus fremontii*). These areas are known to be extremely fertile for use as agricultural cropland and grazing land; thus, much of the land suitable for valley oak regeneration has been lost as a result of destruction of the habitat and lack of adequate soil moisture (Adams and others, 1992; Griggs and Golet, 2002; Howard, 1992; Meyer, 2002; Olson, 1998). Valley oak is a deciduous tree that requires large amounts of water at the rooting depth and the rich soil created by spring flooding (Pavlik and others, 1993). Natural regeneration of the valley oak has been steadily declining, primarily because of the loss of habitat and removal of natural yearly flooding events (Sork and others, 2002). Regeneration of valley oak woodland that is used by deer, rodents, and feral pigs is difficult because of predation of the seedlings within the first year. This woodland has been altered significantly as a result of the rapid drainage of water through the sandy soils, altered hydrology, increased annual grass understory, wildlife predation of the seedlings, and increased shade created by the older remaining valley oak trees.

Characterization and Management

Rangeland is subject to an abundance of uses; therefore, it is important to characterize and quantify rangeland based on its ability to produce various kinds, proportions, and amounts of plants. The plant communities are largely dependent on the soils, climate, topography, aspect, slope, and other abiotic features of the landscape. To assist in the understanding of soil-plant interaction and the effect of selected management practices, the Natural Resources Conservation Service classifies rangeland into ecological sites. An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation (National Range and Pasture Handbook http://www.glti.nrcs.usda.gov/) (USDA, 2003).

Soil types and plant communities are correlated and serve as the basis for the development of each ecological site description. Soil properties that affect moisture supply and plant nutrients, such as texture, depth, and amount of coarse fragments, have the greatest influence on the productivity of rangeland plants and the composition and distribution of the plant community. Soil reaction, salt content, fog drip, and a seasonal high water table are also important. Geography and climate influence the location of plant communities across the landscape and affect various soil properties. For example, soils on southerly and westerly slopes commonly support chaparral-type species and plant communities as a result of the intense heat, high evapotranspiration rate, and droughtiness. Soils on northerly and easterly slopes are exposed to less solar radiation and generally support forestland plant communities. Differences in the soil properties that affect plant community composition, production, and distribution are considered in correlating ecological sites to individual soils.

Table 6 shows, for each soil in a map unit, the ecological site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the expected percentage of each species. An explanation of the column headings in the table follows.

An *ecological site* is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, which has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of the site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

Total dry-weight production is the amount of vegetation that can be expected to grow annually in a well managed area that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods. The total production figures can be used to calculate carrying capacity and stocking rates for management of domestic animals or wildlife and to determine fuel loading for prescribed burning plans or fire modeling.

Characteristic vegetation is the grasses, grasslike plants, forbs, and shrubs that make up most of the potential natural plant community. The species are listed by common name (See Appendix, page 363). All of the plant names are correlated directly with the PLANTS Database (http://plants.usda.gov). Under *species composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in chapter 4 of the "National Range and Pasture Handbook" (http://www.ftw.nrcs.usda.gov/glti/NRPH.html).

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Ecological Sites in the Survey Area

A brief description of the ecological sites in the survey area is given in the following paragraphs. A complete description of the ecological sites can be obtained from the local office of the Natural Resources Conservation Service or downloaded from the Ecological Site Information System website at http://esis.sc.egov.usda.gov/. See table 6 for the specific soils in the survey area that are correlated to each ecological site.

Hills, South-Facing 17-19" P.z. (R015XI100CA) (fig. 1).—This site is on all aspects, but it is almost exclusively on south- and west-facing slopes. It supports dominantly chamise (*Adenostoma fasciculatum*) with a reasonably high density and very little understory. In areas where the chamise is less vigorous or has been recently burned, buckbrush (*Ceanothus cuneatus*), black sage (*Salvia mellifera*), common deerweed (*Lotus scoparius*), and California buckwheat (*Eriogonum fasciculatum*) are intermixed with the chamise. Where there are open patches, the understory is a mix of native and annual grasses (*Nassella spp., Poa spp., Melica spp., Avena spp.*, and *Bromus spp.*), forbs (*Clarkia spp., Claytonia spp., Gallium spp.*, and *Hypochaeris spp.*) and bushy spikemoss (*Selaginella bigelovii*). Slopes range from 2 to 70 percent, but slopes of 35 to 70 percent are most typical. Elevation is 951 to 2,706 feet. This site is underlain by several different kinds of parent material, although a large percentage is underlain by granite and sedimentary rock. Sandy soils that are erodible and have a very low available water capacity and high evapotranspiration rate are derived from these rocks. Chamise is capable of inhabiting this dry, exposed environment and can quickly recover after fires, restabilizing the slopes and commonly developing into dense stands because of the lack of plant competition. The soils are primarily Entisols and Mollisols with an argillic horizon, and they are shallow to moderately deep to bedrock.

Upper, North-Facing 17-19" P.z. (R015XI101CA) (fig. 2).—This site is almost exclusively on upper, more exposed to strongly sloping, north-facing hillsides. Slopes range from 2 to 70 percent, but slopes of 35 to 70 percent are most typical. Elevation is 984 to 3,362 feet. Bigberry manzanita (*Arctostaphylos glauca*), pointleaf manzanita (*Arctostaphylos pungens*), chamise (*Adenostoma fasciculatum*), and buckbrush (*Ceanothus cuneatus*) are the dominant species on this site. Other notable species include toyon (*Heteromeles arbutifolia*), hollyleaf cherry (*Prunus ilicifolia*), birchleaf mountain mahogany (*Cercocarpus betuloides var. betuloides*), scrub oak (*Quercus berberidifolia*), blue oak (*Quercus douglasii*), interior live oak (*Quercus wislizeni*), and foothill pine (*Pinus sabiniana*). This site is extensively diverse, primarily because of the better moisture conservation and cooler temperatures on the strongly sloping, north aspects. On the uppermost part of the hills there is a noticeably higher dominance of manzanita (*A. glauca* and *A. pungens*), buckbrush (*C. cuneatus*) and

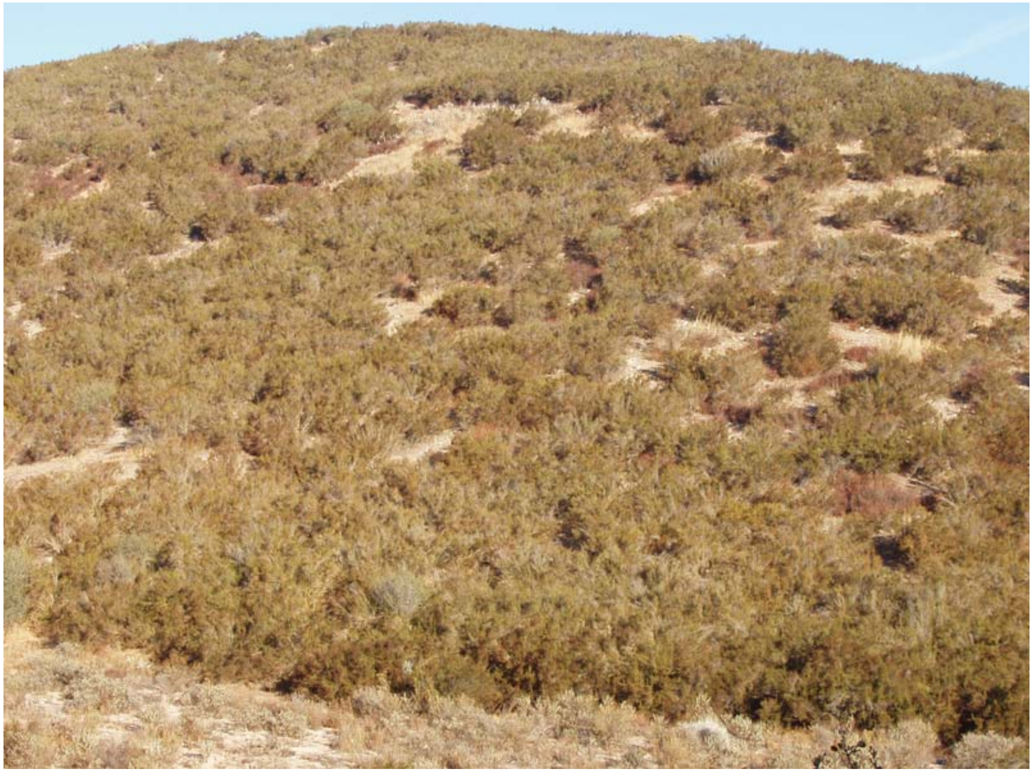


Figure 1.—Typical area of Hills, South-Facing 17-19" P.z. (R015XI100CA) ecological site.

Figure 2.—Typical area of Upper, North-Facing 17-19" P.z. (R015XI101CA) ecological site.

chamise (*Adenostoma fasciculatum*); on the middle slopes there is a much greater mix of all of the species; and in the concave depressions into which water drains and temperatures stay cooler there is a much higher dominance of toyon (*H. arbutifolia*), birchleaf mountain mahogany (*C. betuloides var. betuloides*), and hollyleaf cherry (*P. ilicifolia*). Foothill pine is scattered throughout this site, but it is most common in drainageways and areas of fractured bedrock, including the Pinnacles and rock outcroppings. The soils are shallow to very deep. Most of the soils have an argillic horizon and an extremely gravelly sandy texture. Erosion is a significant factor on this site. It keeps the surface layer thin and disturbed, thus maintaining a mixed chaparral community with species that can thrive under these conditions. The adjacent related ecological site, Footslopes & Backslopes, North-Facing 17-19" P.z. (R015XI105CA), is on the footslopes and backslopes just below this site, and it supports dominantly hollyleaf cherry (*P. ilicifolia*), California buckeye (*Aesculus californica*), and California live oak (*Quercus agrifolia*).

Riparian Areas 17-19" P.z. (R015XI103CA) (fig. 3).—This ecological site is primarily on stream terraces and on the lower slopes of hills. Slopes range from 0 to 50 percent. Elevation is 656 to 1,968 feet. The areas of this site on stream terraces support dominantly Fremont's cottonwood (*Populus fremontii var. fremontii*), California sycamore (*Platanus racemosa*), willows (*Salix exigua, S. laevigata*, and *S. lasiolepis*) and sedges and rushes (*Carex* and *Juncus spp.*), and the areas in canyons along Bear Creek support dominantly California live oak (*Quercus agrifolia*), California sycamore (*Platanus racemosa*), California buckeye (*Aesculus californica*) and poison oak (*Toxicodendron diversilobum*). Because of the changes in the hydrology and the time and frequency of water flowing through the streams, the riparian vegetation is highly variable and includes areas that support dominantly upland species, including California buckwheat (*Eriogonum fasciculatum*), chamise (*Adenostoma fasciculatum*) and several annual grasses (*Avena spp., Bromus spp.*, and *Vulpia spp.*). The soils are deep, and they formed in several kinds of alluvial

Figure 3.—Typical area of Riparian Areas 17-19" P.z. (R015XI103CA) ecological site.

parent material, including that derived from rhyolite, granite, and volcanic and sedimentary rock. Texture of the soils ranges from gravelly loamy coarse sand to clay.

Steep, Clayey-Skeletal, South-Facing Slopes 17-19” P.z. (R015XI104CA) (fig. 4).—This ecological site is on south- and west-facing slopes of hills. Slopes range from 50 to 70 percent. Elevation is 984 to 3,280 feet. This site is commonly referred to as coastal sage scrub and is distinguished by a dominance of California sagebrush (*Artemisia californica*) with black sage (*Salvia mellifera*) as a less dominant species. The dominant herbaceous species are foothill needlegrass (*Nassella lepida*), purple needlegrass (*Nassella pulchra*), paintbrush (*Castilleja spp.*), and lupine (*Lupinus spp.*). This site is prominent in areas that are strongly sloping, very rocky, and dry. The soils formed in residuum derived from rhyolite, dacite, and andesite. They are deep and well drained and are gravelly loam to extremely gravelly clay loam. This site is associated with the Hills, South-Facing 17-19" P.z. (R015XI100CA) ecological site.

Footslopes & Backslopes, North-Facing 17-19” P.z. (R015XI105CA) (fig. 5).—This ecological site is on steep or very steep, north-facing slopes. Slopes range 50 to 70 percent. Elevation is 984 to 3,362 feet. This site supports dominantly hollyleaf cherry (*Prunus ilicifolia*), California live oak (*Quercus agrifolia*), and California buckeye (*Aesculus californica*). Other notable species include poison oak (*Toxicodendron diversilobum*), buckbrush (*Ceanothus cuneatus*), and toyon (*Heteromeles arbutifolia*). The understory species are generally minimal, but they consist primarily of native annual forbs; scattered native perennial bunchgrasses, including Sandberg bluegrass (*Poa secunda*); oniongrasses (*Melica spp.*); and ferns (*Polypodium spp., Adiantum jordanii, Aspidotis californica, Cheilanthes spp., Pellaea spp.*, and *Pentagramma spp.*). The soils are shallow to very deep and are rocky. They are on backslopes and footslopes of the hills around the High Peaks, the Chalone Peaks, and Mount Defiance. Although the depth of the soils varies, the vegetation is similar throughout the site because it is on strongly sloping north aspects. The shallower soils, however, have a much higher abundance of cherry and buckbrush and the deeper soils support more California live oak and buckeye. The soils formed in residuum derived from rhyolitic breccia and in colluvium derived from rhyolite. The soils are dark colored and enriched with organic matter, are well drained, and are gravelly sandy loam.

Diatomaceous Hillslopes 17-19” P.z. (R015XI106CA) (fig. 6).—This ecological site is characterized by noticeably white soils composed of diatomaceous mudstone. It is on steep and very steep hills north of Horse Valley. Slopes range from 30 to 70 percent. Elevation is 984 to 2,296 feet. This site supports dominantly scrub oak (*Quercus berberidifolia*), interior live oak (*Quercus wislizeni*), and common deerweed (*Lotus scoparius*). Other notable species include chamise (*Adenostoma fasciculatum*) and bigberry manzanita (*Arctostaphylos glauca*). Very little understory or litter is on this site. The soils formed in acidic, highly fractured, low-density rock that is low in nutrients; however, they are capable of storing water for plant use. The soils are erodible and have a thin dark-colored gravelly loam surface layer with an extremely gravelly loam subsurface layer.

Upper Stream Terraces 17-19” P.z. (R015XI107CA) (fig. 7).—This ecological site is on valley flood plains and in river valleys above the Riparian Areas 17-19” P.z. (R015XI103CA) ecological site. This site is on all aspects at an elevation of 984 to 1,640 feet. It is on slopes of 0 to 30 percent, although slopes of 0 to 9 percent are most typical. This site supports dominantly interior live oak (*Quercus wislizeni*), California wild rose (*Rosa californica*), California blackberry (*Rubus ursinus*), deergrass (*Muhlenbergia rigens*), and creeping wildrye (*Leymus triticoides*). Other notable species include California live oak (*Quercus agrifolia*), California sycamore (*Platanus racemosa*), foothill pine (*Pinus sabiniana*), and willows (*Salix spp.*) on the high stream terraces. The soils formed in sandy alluvium derived from igneous and sedimentary rock and fanglomerate. They are very deep and well drained and are

Figure 4.—Typical area of Steep, Clayey-Skeletal, South-Facing Slopes 17-19" P.z. (R015XI104CA) ecological site.

Figure 5.—Typical area of Footslopes & Backslopes, North-Facing 17-19" P.z. (R015XI105CA) ecological site.

Figure 6.—Typical area of Diatomaceous Hillslopes 17-19" P.z. (R015XI106CA) ecological site.

Figure 7.—Typical area of Upper Stream Terraces 17-19" P.z. (R015XI107CA) ecological site.

gravelly loamy sand to a depth of more than 60 inches. The available water capacity is low.

Clayey, Valley Flats 17-19” P.z. (R015XI108CA) (fig. 8).—This ecological site is on nearly level to gently sloping valley floors. It is on all aspects at an elevation of 492 to 1,640 feet. It supports a variety of native grasses, forbs, sedges, and rushes. The dominant species include blue wildrye (*Elymus glaucus*), creeping wildrye (*Leymus triticoides*), annual deschampsia (*Deschampsia danthonioides*), bentgrass (*Agrostis spp.*), meadow barley (*Hordeum brachyantherum*), sedges (*Carex spp.*), baltic rush (*Juncus balticus*), and toad rush (*Juncus bufonius*). Although there are very few areas of this site in the survey area, there are areas where some of these species make up a portion of the plant community. There are small areas of this ecological site, primarily in areas of the Elder series, where frequent, brief periods of flooding occur. These areas can support water-obligate species such as California wild rose (*Rosa californica*), willows (*Salix spp.*), sedges (*Carex spp.*), and rushes (*Juncus spp., Cyperus spp., Eleocharis spp.,* and Scirpus spp.). The soils formed in material derived from granite, fanglomerate, volcanic rock, and sedimentary rock. They are very deep and well drained and have moderately slow permeability and a high available water capacity.

Dry, Outwash Fans 17-19” P.z. (R015XI109CA) (fig. 9).—This ecological site is on outwash fans throughout Bear Valley and is adjacent to the Hills, South-Facing 17-19" P.z. (R015XI100CA) ecological site. It is on all aspects at an elevation of 984 to 1,640 feet. It is on slopes of 0 to 30 percent, although slopes of 2 to 9 percent are most typical. It supports dominantly silver bush lupine (*Lupinus albifrons var. albifrons*), butterweeds (*Senecio spp.*), and some scattered chamise (*Adenostoma fasciculatum*). The soils are very deep and well drained, and they formed in sandy alluvium derived from igneous and sedimentary rock. They are coarse grained and are gravelly loamy sand to a depth of more than 60 inches.

Exposed, Rocky Slopes 17-19” P.z. (R015XI110CA) (fig. 10).—This ecological site is in exposed areas of dominantly rock outcroppings and shallow soils. It is generally

Figure 8.—Typical area of Clayey, Valley Flats 17-19” P.z. (R015XI108CA) ecological site.

Figure 9.—Typical area of Dry, Outwash Fans 17-19" P.z. (R015XI109CA) ecological site.

on south aspects. Slopes are 20 to 70 percent. Elevation is 984 to 2,493 feet. This site is characterized by a dominance of bushy spikemoss (*Selaginella bigelovii*). It also supports scattered patches of chamise (*Adenostoma fasciculatum*), California buckwheat (*Eriogonum fasciculatum*), foothill pine (*Pinus sabiniana*), and needlegrasses (*Nassella spp.*). Bushy spikemoss has played a major role in the formation of this site by capturing sediment as it is being washed off the rock ledges and outcroppings. The soils are very shallow and are extremely gravelly sandy loam over hard bedrock.

Quercus Douglasii/Nassella Pulchra-Koeleria Macrantha 17-19" P.z. (F015XI200CA) (fig. 11).—This ecological site is on gently sloping to very steep, north-facing hillslopes. Slopes range from 2 to 70 percent. Elevation is 951 to 3,280 feet. The site supports dominantly blue oak (*Quercus douglasii*) with a herbaceous understory of native bunchgrasses, including purple needlegrass (*Nassella pulchra*), junegrass (*Koelaria macrantha*), California brome (*Bromus californica*), Sandberg bluegrass (*Poa secunda*), and California melic (*Melica californica*), and many annual and perennial forbs. The soils formed in two very different kinds of parent material derived from granite and andesite. The soils that formed in granitic parent material are deep, coarse grained, and acidic. Those that formed in andesitic parent material are moderately deep, finer grained, and acidic and have a high shrink-swell potential.

Quercus Lobata-Quercus Wislizeni/Carex Barbarae 17-19" P.z. (F015XI201CA) (fig. 12).—This ecological site is on stream terraces in McCabe Canyon, where flooding occurs and ground water is very deep below the surface. Slopes range from 0 to 5 percent. Elevation is 984 to 1,640 feet. The dominant tree is valley oak (*Quercus lobata*), the codominant species is interior live oak (*Quercus wislizeni*), and the understory is almost exclusively Santa Barbara sedge (*Carex barbarae*). The soils formed in alluvium derived from igneous and sedimentary rock. They are deep, coarse grained, and well drained, and they have a high rate of permeability

Figure 10.—Typical area of Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA) ecological site.

Figure 11.—Typical area of Quercus Douglasii/Nassella Pulchra-Koeleria Macrantha 17-19" P.z. (F015XI200CA) ecological site.

Figure 12.—Typical area of Quercus Lobata-Quercus Wislizeni/Carex Barbarae 17-19” P.z. (F015XI201CA) ecological site.

because of the high content of organic matter. This site is similar to the Upper Stream Terraces 17-19" P.z. (R015XI107CA) and Dry, Outwash Fans 17-19" (R015XI109CA) ecological sites, which support dominantly interior live oak or silver bush lupine and have a much lower organic matter content and lower rate of nutrient cycling.

Following is a numerical list of the ecological sites in the survey area:

Quercus Douglasii/Nassella Pulchra-Koeleria Macrantha 17-19” P.z. F015XI200CA
Quercus Lobata–Quercus Wislizeni/Carex Barbarae 17-19” P.z. F015XI201CA
Hills, South-Facing 17-19” P.z. R015XI100CA
Upper, North-Facing 17-19” p.z R015XI101CA
Riparian Areas 17-19” P.z. R015XI103CA
Steep, Clayey-Skeletal, South-Facing Slopes 17-19” P.z. R015XI104CA
Footslopes & Backslopes, North-Facing 17-19” P.z. R015XI105CA
Diatomaceous Hillslopes 17-19” P.z. R015XI106CA
Upper Stream Terraces 17-19” P.z. R015XI107CA
Clayey, Valley Flats 17-19” P.z. R015XI108CA
Dry, Outwash Fans 17-19” P.z. R015XI109CA
Exposed, Rocky Slopes 17-19” P.z. R015XI110CA

Following is an alphabetical list of the ecological sites in the survey area:

Clayey, Valley Flats 17-19” P.z. R015XI108CA
Diatomaceous Hillslopes 17-19” P.z. R015XI106CA

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (USDA, 1961). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

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

Class 1 soils have slight limitations that restrict their use.

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

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

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

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

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

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

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

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

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

The capability classification of map units in this survey area is given in the section “Detailed Soil Map Units.”

Major Land Resource Areas

A major land resource area (MLRA) is a broad geographic area that has a distinct combination of physiography, geology, climate, water, biological resources, and land use. Pinnacles National Monument is in two of these areas—the Central California Coast Range (MLRA 15) and Central California Coastal Valleys (MLRA 14). The MLRA for each soil in the survey area is given in the section “Detailed Soil Map Units.”

Central California Coast Range (MLRA 15)

This MLRA makes up about 17,840 square miles (46,235 square kilometers) of California. Most of this MLRA consists of farms and ranches, and the rest is mostly Federally owned land. The dominant crop is grain. The areas used as rangeland support naturalized annual and native perennial grasses and brush. Blue oak, valley oak, and canyon live oak are the dominant trees with some Douglas fir, madrone, grand fir, tanoak, and bigleaf maple and a few remnant stands of redwood in areas that receive more moisture. Surface water provides most of the water used in the area.

The town of Clearlake is nearly at the center of the northern part of this area, and the towns of Suisun City and Benicia are at the southern end of the northern part. The towns of Martinez, Concord, Pleasant Hill, and Alamo are at the northern end of the southern part of this area. The towns of Atascadero and Paso Robles are in the southern end of the southern part. Hunter Liggett and Camp Roberts Military Reservations, Vandenburg Air Force Base, and Santa Ynez Indian Reservation are at the southern part of this area. Parts of the Mendocino and Trinity National Forests are along the western edge of the northern part. The Los Padres National Forest is at the southern end of the southern part. U.S. Interstate 80 crosses the junction of the northern and southern parts of this area, just north of the Carquinez Strait, connecting the Sacramento-San Joaquin Delta with San Pablo Bay.

Physiography.—All of MLRA 15 is in the Pacific Border province of the Pacific Mountain System physiographic division. Most of this MLRA is in the California Coast Ranges physiographic section. The extreme northern end is in the Klamath Mountains physiographic section, and the southwestern corner is in the Los Angeles Ranges section.

This MLRA is comprised of gently sloping to steep, low mountains. The coastal plains are narrow and discontinuous, and the stream valleys are narrow and widely separated. Elevation ranges from sea level to 2,650 feet (810 meters) in most of the area, but it ranges to 4,950 feet (1,510 meters) in some of the mountains.

Clear Lake and Lake Berryessa are in the northern part of this area. The northern part is drained by tributaries of the Sacramento River, such as Cache and Putah Creeks. There are few perennial streams in the southern part. Streams in the southern part typically drain into the Pacific Ocean.

Geology.—The landscape and geology of the Coast Range are strongly controlled by right-lateral strike-slip movement along the San Andreas Fault and other active and inactive faults that dissect the range. The northwest-southeast orientation of the river courses and intervening ridges reflects the young geologic history along a transform boundary, where the Pacific tectonic plate is moving northwest relative to the North American plate to the east. Recent and historic earthquakes centered in the Coast Range, including the 1906 San Francisco earthquake, the 1989 Loma Prieta earthquake, and the numerous large earthquakes centered near Parkfield (most recently in September of 2004), attest to the active plate motion and associated seismicity that continue to shape the landscape.

Most of the Northern Coast Range is underlain by deformed and metamorphosed sandstone and shale of the Franciscan Formation, which were deposited offshore during the Mesozoic, conveyed eastward toward the Franciscan trench, and then subducted as a series of terranes beneath the old ocean floor at the continental margin. Narrow bands of serpentine-bearing ophiolites, which are remnants of old ocean floor, separate these Franciscan terranes from the relatively undisturbed marine sedimentary rock of the Great Valley sequence, which is exposed along the eastern margin of the Northern Coast Range. The Central Belt of the Franciscan Formation consists of a highly disturbed melange, which was intensely sheared and deformed when strike-slip movement along the San Andreas Fault replaced subduction through the Franciscan trench beginning about 30 million years ago. Melange consists of relatively resistant metamorphic rock and boulders “floating” in intensely sheared and weak matrix material. Steep areas underlain by Franciscan mélange tend to be highly prone to landslides.

The geology of the Southern Coast Range is highly variable. It includes bands of the Franciscan Formation along the northeastern edge of the San Andreas Fault and along the southeastern edge of the Nacimiento Fault, in the Santa Lucia Range; Mesozoic granitic rock of the Salinian block, which was “rafted” hundreds of miles to the present location in Pinnacles National Monument and elsewhere in the Coast Range by movement along the transform boundary; and Tertiary and Pleistocene marine and nonmarine sedimentary formations, including the diatomaceous Monterey Shale, which is a significant source rock for oil reserves.

Climate.—In the area south of San Francisco, the average annual precipitation is 6 to 20 inches (150 to 510 millimeters) and snowfall is rare. The northern part of this MLRA can be divided into two rainfall and snowfall zones. In the southern half, north of San Francisco, the average annual precipitation is 18 to 40 inches (460 to 1,015 millimeters) and snowfall is rare. In the northern half, the average annual precipitation is 40 to 79 inches (1,015 to 2,010 millimeters) and snowfall is common.

Precipitation is evenly distributed throughout fall, winter, and spring, but it is very low in summer. Coastal areas receive some moisture from fog in summer. Most of the rainfall occurs as low- to moderate-intensity, Pacific frontal storms in October through May. The average annual temperature is 51 to 66 degrees F (10 to 19 degrees C), decreasing from south to north. The average frost-free period is 275 days (180 to 365 days), decreasing with elevation and from south to north.

Water.—The total amount of freshwater used averages 680 million gallons per day. About 22 percent is from groundwater sources, and 78 percent is from surface water sources. The low to moderate rainfall and moderate streamflow limit agriculture to dry farming in most of the MLRA. Reservoirs store surface runoff for use during most of the year when the water level in the streams is low. The quality of the surface water is generally good, and the water is suitable for most uses.

Groundwater is limited. There are some wells in areas of alluvium and older sediment in the major river valleys and low areas. This water is very hard and typically requires softening prior to use. The levels of total dissolved solids exceed the National standard of 500 parts per million (milligrams per liter) for drinking water. Some groundwater is in areas of igneous rock. Yields from wells in these areas are low, since the water is in the joints and fractures in the bedrock. Few test results are available, so little is known about the quality of the water.

Soils.—The dominant soils in this MLRA are Alfisols, Entisols, Mollisols, and Vertisols. The soils dominantly have a thermic soil temperature regime, a xeric soil moisture regime, and mixed or smectitic mineralogy. They are generally very shallow to deep, somewhat excessively drained or well drained, and loamy or clayey.

Argixerolls (Backdoor and Casino series), Haploxerepts (Chalone series), Haploxerolls (Firstsister, Highpeaks, Ordeal, and Santa Lucia series), Palexeralfs (Pinnacles series), Palexerolls (Tuborcio series), and Xerorthents (Burgundy, Knuckle, Passion, and Teapot series) formed in residuum on hills and mountains.

Biological resources.—This MLRA supports grasses, grass-oak, and shrubs. Naturalized annuals, including soft chess, brome, fescue, wild oat, filaree, and burclover, characterize the open oak woodland. Blue oak, valley oak, and canyon live oak are the dominant trees. California sagebrush, coyotebrush, chamise, manzanita, ceanothus, and scrub oak are the major brush species. Along the west side of the Coast Range are forests of Douglas fir, madrone, grand fir, tanoak, and bigleaf maple and a few remnant stands of redwood. Stands of ponderosa pine with madrone, black oak, live oak, California buckeye, manzanita, and ceanothus are in the drier areas.

Some of the major wildlife species in this MLRA are black-tailed deer, feral pig, turkey, blue grouse, valley quail, and band-tailed pigeon. The fish species include trout, largemouth bass, bluegill, minnow, stickleback, channel catfish, bullhead, carp, sculpin, steelhead, salmon, and crappie.

Land use.—More than 80 percent of the land in this MLRA is used as farms and ranches; most of the remainder is Federally owned land. About 10 percent is used for dry-farmed grain, and slightly more than 60 percent is rangeland that supports native grasses and brush. About 25 percent of the land is open woodland, which is also used for grazing. Small acreages consist of forests and urban areas.

The major soil resource concerns are soil erosion, maintenance of soil organic matter, water quality, and low infiltration rates because of the hydrophobic characteristic of the soils. If left unprotected in winter, the hazard of sheet and gully erosion is severe on the sloping soils on terraces and benches and on the upland soils.

Central California Coastal Valleys (MLRA 14)

This MLRA makes up about 3,170 square miles (8,215 square kilometers) of California. It consists mainly of farms and ranches, but about one-third of the land is used for urban development. The gently sloping valleys are intensely cropped. Dairy farming is an important enterprise near large cities. The more sloping fans and foothills are under native range and are used for livestock grazing. This MLRA is composed of gently sloping valley floors bordered by higher and more sloping terraces and alluvial fans and by steep uplands. About half of the water is from groundwater sources, and the other half is from surface water sources.

This MLRA is made up of three parts. The northern part includes the cities of Ukiah, Santa Rosa, and Napa. The central part includes all of the metropolitan areas surrounding San Francisco and San Pablo Bays. The major cities in this part include San Francisco, Berkeley, Vallejo, Oakland, and San Jose. The southern part includes the towns of Santa Cruz, Monterey, and Carmel, on the shores of Monterey Bay. Hollister and the city of Salinas and the agriculturally important Salinas Valley are inland in the southern part. U.S. Interstate 80 ends on the San Francisco side of the Bay Bridge. U.S. Highway 101 and California State Highway 1 are scenic major thoroughfares in this MLRA.

Physiography—This MLRA is in the California Coast Ranges section of the Pacific Border province of the Pacific Mountain System physiographic division. It is a network of gently sloping valley floors bordered by higher and more sloping terraces and alluvial fans and by steep uplands. Elevation ranges from sea level to 1,970 feet (600 meters), but it is dominantly less than 985 feet (300 meters).

The Russian River flows through the northern part of this MLRA, and the Napa and Petaluma Rivers empty into San Pablo Bay. The Salinas River is in the southern part. The Hetch Hetchy Aqueduct carries Sierra Nevada Mountain water from the Yosemite area to the bay area for municipal, public, and industrial use. The aqueduct empties into the Upper Crystal Springs Reservoir, in the San Andreas Fault zone just south of San Francisco.

Geology.—With the possible exception of the Santa Maria Valley to the south, the coastal valleys are structural basins whose elongated shape and northwest-southeast orientation are strongly controlled by right-lateral strike-slip movement along a regional set of faults that includes the San Andreas, Rogers Creek, Hayward, and Calaveras Fault zones and other potentially active and inactive faults. The San Andreas Fault zone is a transform boundary where the Pacific tectonic plate is moving northwest relative to the North American plate to the east. The probability of a large magnitude earthquake is considered to be particularly high along the Rogers Creek-Hayward Fault zones, which together extend from approximately Healdsburg southeastward beneath San Pablo Bay toward Milpitas.

These coastal valleys are partly filled with unconsolidated and semiconsolidated marine sedimentary rock that was deposited during periodic encroachment of the sea and with unconsolidated nonmarine alluvial, flood plain, alluvial fan, and hillslope deposits derived from bedrock of adjacent uplands. Older, more consolidated eolian, lacustrine, and terrace deposits are also present. The coarser, more permeable nonmarine sand and gravel store relatively large volumes of fresh groundwater; these coastal basin aquifers are confined, semiconfined, or unconfined and are in areas at risk of saltwater intrusion and overdraft.

Mesozoic and Tertiary bedrock exposed on the hills, foothills, and other uplands includes the Sonoma Volcanics in and around Napa and Sonoma Valleys; graywacke, chert, ophiolite, and other rock of the Franciscan Formation; metamorphic and granitic rock of the Salinian block that flanks the Salinas Valley; and sedimentary formations exposed near the Salinas and Santa Maria Valleys. Landslides are common in steep areas underlain by rock weakened by faulting and deformation (e.g., Central Belt Franciscan Formation) and/or lack of cementation (e.g., Tertiary sedimentary shale).

Climate.—In most of the area south of San Francisco, the average annual precipitation is 11 to 20 inches (280 to 510 millimeters). In most of the area north of San Francisco, the average annual precipitation is 18 to 35 inches (280 to 510 millimeters). Most of the rainfall occurs as low- to moderate-intensity, Pacific frontal storms in winter. This MLRA is very dry from mid-spring to mid-autumn. Snowfall is rare. The annual rainfall can be as high as 66 inches (1,675 millimeters) at the higher elevations. The average annual air temperature is 56 to 61 degrees F (13 to 16 degrees C). The average frost-free period is 315 days (265 to 365 days). The frost-free period is longest in areas near the coast, and it decreases with elevation.

Water.—The total amount of freshwater use averages 3,100 million gallons per day. About 56 percent is from groundwater sources, and 44 percent is from surface water sources. The low to moderate rainfall and local streamflow are inadequate to meet present water needs. Water from adjoining MLRAs is brought in for agriculture and for the domestic and industrial requirements of the many large cities. For example, most of the public water supply for the bay area is provided by an aqueduct from Hetch Hetchy Reservoir, in the Sierra Nevada Mountains. The quality of the water in Hetch Hetchy Reservoir is excellent. The quality of the surface water from rivers in the valley is not as good. Agricultural runoff, municipal and industrial waste, and irrigation return flows are all sources of contamination of local surface water.

The major groundwater sources in this MLRA are the alluvium and older sediment in the coastal valleys. Surface water infiltration from irrigated areas mixes with the shallow ground water in this aquifer, so some of the actual water pumped is a combination of surface water and groundwater. This water is very hard and requires softening for public, municipal, and domestic use. It typically contains more than 1,000 parts per million (milligrams per liter) total dissolved solids, which exceeds the National standard for drinking water. Yields of groundwater in the deeper alluvial deposits, especially in the Santa Clara Valley, are declining, and intrusion of seawater is also becoming a problem. Nitrate and pesticide contamination in the shallow aquifer in the Salinas Valley is also becoming a concern.

Soils.—The dominant soils in the MLRA are Alfisols, Entisols, Mollisols, and Vertisols. The soils dominantly have a thermic soil temperature regime, a xeric soil moisture regime, and mixed or smectitic mineralogy. They are generally very deep, somewhat excessively drained to somewhat poorly drained, and loamy or clayey.

Argoxerolls (Rimtrail series), Haploxerolls (Elder series, Oxyaquic Haploxerolls, Pinncamp and Still series), and Xeropsamments (Toags series) formed in alluvium on flood plains, stream terraces, valley flats, alluvial fans, and outwash fans.

Biological resources.—This MLRA supports grasses, brush, and trees. Naturalized annual grasses and forbs are dominant in many places. Soft chess, wild oat, brome, fescue, filaree, burclover, and some remnant perennials are the major species. Scattered valley oak grows on the well drained soils. Saltgrass, iodinebush, and other salt-tolerant plants grow in tidal areas. There are a few remnant stands of redwood.

Some of the major wildlife species are turkey, California quail, mourning dove, meadowlark, blackbird, white-crowned sparrow, white-tailed kite, robin, mockingbird, thrush, brown towhee, and cedar waxwing.

Land use.—Most of this MLRA is used for farms and ranches. About one-third is used for urban development, and the acreage used for this purpose is increasing rapidly. The gently sloping soils in the valleys are intensively farmed. Truck crops, wine grapes, strawberries and other fruit, cut flowers, small grain, hay, and pasture are the principal crops grown on the irrigated land. Small grain is the principal crop grown in the dry-farmed areas. Dairy farming is an important enterprise near the large cities. The more sloping fans and foothills, which make up one-fourth or more of the area, are under native range used for livestock grazing. Sites along streams are susceptible to flooding and bank cutting.

The major soil resource concerns are soil erosion, maintenance of soil organic matter, and water quality. The erosion hazard is slight on the soils in valleys and on terraces and benches of the valleys, except in areas where improper irrigation practices are used. The hazard of sheet and gully erosion is severe on the sloping soils on coastal terraces and benches and on the upland soils unless they are protected in winter. Salinity and encroachment of seawater into groundwater basins is a problem in areas at sea level near the valleys (USDA, 2006).

Urban and Recreational Uses

The soils of the survey area are rated in tables 7a and 7b according to limitations that affect their suitability for urban and recreational uses. The numerical ratings (“Value” columns) in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 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 urban and recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning urban and recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in the tables 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.

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; soil wetness; 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 material. The properties that affect trafficability are flooding, soil wetness, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in 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; soil wetness; 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 material. The properties that affect trafficability are flooding, soil wetness, ponding, slope, fragments on the surface, 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.

Hydric Soils

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

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

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

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in “Field Indicators of Hydric Soils in the United States” (Hurt and Vasilas, 2006).

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

In the following map units, the Oxyaquic Haploxerolls, a major component of the units, meet the definition of hydric soils.

131 Firstsister-Oxyaquic Haploxerolls-Rock outcrop complex, 0 to 50 percent slopes
136 Oxyaquic Haploxerolls, 0 to 1 percent slopes

In the following map units, only the Oxyaquic Haploxerolls that are a minor component meet the definition of hydric soils. The soils are on low stream terraces.

106 Casino-Argixerolls complex, 50 to 70 percent slopes
109 Rock outcrop-Highpeaks-Burgundy complex, 35 to 100 percent slopes

113 Elder-Oxyaquic Haploxerolls complex, 2 to 5 percent slopes
117 Elder gravelly sandy loam, 0 to 1 percent slopes
127 Argixerolls-Rock outcrop-Chalone complex, 35 to 50 percent slopes
132 Toags-Oxyaquic Haploxerolls-Riverwash complex, 0 to 2 percent slopes
133 Toags-Pinncamp complex, 0 to 5 percent slopes
135 Toags-Riverwash complex, 0 to 9 percent slopes

These lists can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and Vasilas, 2006).

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

Engineering

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

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 8a and 8b show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, and shallow excavations.

The numerical ratings ("Value" columns) in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 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.

Sanitary Facilities

Tables 9a and 9b show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The numerical ratings (“Value” columns) 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.

Construction Materials

Tables 10a and 10b give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 10a, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good, fair,* or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The numbers 0.00 to 0.07 indicate that the layer is a poor source. The numbers 0.75 to 1.00 indicate that the layer is a good source. The numbers 0.08 to 0.74 indicate the degree to which the layer is a likely source.

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

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

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

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

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

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

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

Water Management

Table 11 provides information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for embankments, dikes, and levees and pond reservoir areas. *No limitations* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Limitations* with ratings between 0 and 1 can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limitations* with a rating value of 1 indicate 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 (“Value” columns) in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 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).

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

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

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

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

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

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

Engineering Index Properties

Table 12 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, 2001; PCA, 1973) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000; PCA, 1973).

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

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

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

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

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

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

The estimates of 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 Properties

Table 13 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 13, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^{1}/_{3}$- or $^{1}/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots.

Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

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 13, 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.

Chemical Properties

Table 14 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 14, 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.

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

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

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

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

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

Table 15 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.

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

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 15 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.

Soil Features

Table 16 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 of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

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

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

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

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

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given available online at http://ssldata.nrcs.usda.gov. The data are for soils sampled at carefully selected sites. Unless otherwise indicated, the pedons are typical of the series. They are described in the section “Taxonomic Units and Their Morphology.” Soil samples were analyzed by the National Soil Survey Laboratory in Lincoln, Nebraska. Analyzed were soils of the Burgundy, Casino, Firstsister, Highpeaks, Longsfolly (not type location), Ordeal (not type location because the soils are a taxadjunct), Pinncamp (sampled as Corralitos), Still, Toags, and Tuborcio (taxadjunct and type location) series.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (USDA, 2004).

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all material less than 75 mm (3A2a).
Coarse materials—(2-250 mm fraction) volume estimates of the percentages of all material greater than 2 mm (3A2b).
Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Carbonate clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; $^1/_3$ or $^1/_{10}$ bar (3C1c), 15 bars (3C2a1a).
Water-retention difference—between $^1/_3$ bar and 15 bars for whole soil (3D5a).
Water-retention difference—between $^1/_{10}$ bar and 15 bars for whole soil (3D5b).
Bulk density—of less than 2 mm material, saran-coated clods $^1/_3$ bar (3B1b), ovendry (3B1c).
Linear extensibility—change in clod dimension based on whole soil (3D4).
Total nitrogen—thermal conductivity detector (4H2a).
Extractable cations—ammonium acetate pH 7.0, ICP; calcium, magnesium, sodium, potassium (4B1a1a).
Extractable acidity—barium chloride-triethanolamine IV (4B2b1a1).
Cation-exchange capacity—ammonium acetate, pH 7.0 (4B1a1a).
Cation-exchange capacity—sum of cations (4B4b1).
Effective cation-exchange capacity—sum of extractable cations plus aluminum (4B4b2).
Base saturation—ammonium acetate, pH 7.0 (4B4c1).
Reaction (pH)—1:1 water dilution (4C1a2a1).
Reaction (pH)—calcium chloride (4C1a2a2).
Aluminum—ammonium oxalate extraction (4G2a).
Iron—ammonium oxalate extraction (4G2a).
Silica—ammonium oxalate extraction (4G2a).
Sesquioxides—dithionate-citrate extract; iron, aluminum, manganese (4G1).
Carbonate as calcium carbonate—(fraction less than 2 mm [80 mesh]) manometric (4E1a1a1a2).
Electrical conductivity—saturation extract (4F2).
Extractable phosphorus—New Zealand P retention (4D8a1).
Extractable phosphorus—acid oxalate (4G2a).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2003). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 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 Mollisol.

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; 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 Palexerolls (*Pale*, meaning excessive development, plus *xeroll*, the suborder of the Mollisols that has a xeric moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. An example is Ultic Palexerolls, an intergrade to Ultisols (*Ultic*, meaning low base saturation).

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

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.

Taxonomic Units and Their Morphology

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

Argixerolls

Argixerolls consists of soils that are shallow or moderately deep to hard bedrock and are well drained. These soils formed in residuum derived from rhyolite. They are on hills (fig. 13). Slopes range from 20 to 70 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Argixerolls

Reference Pedon Description

Argixerolls gravelly sandy loam on a south-facing hillslope of 25 percent under a cover of chamise at an elevation of 1,890 feet (576 meters) (fig. 14). When described on June 8, 2006, the profile was dry from the surface to a depth of 10 inches (0 to 26 centimeters) and wet from 10 to 27 inches (26 to 68 centimeters).

A1—0 to 4 inches (0 to 10 centimeters); brown (7.5YR 4/2) gravelly sandy loam, very dark brown (7.5YR 2.5/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine roots; many very fine interstitial pores; 25 percent gravel; very strongly acid (pH 5.0); clear smooth boundary.

A2—4 to 10 inches (10 to 26 centimeters); brown (7.5YR 5/2) loam, very dark brown

Figure 13.—Typical area of Argixerolls.

(7.5YR 2.5/2) moist; moderate medium subangular blocky structure; soft, very friable, moderately sticky and slightly plastic; common very fine, fine, and medium roots; many very fine and common fine interstitial pores; 10 percent gravel; strongly acid (pH 5.1); clear smooth boundary.

Bt—10 to 27 inches (26 to 68 centimeters); pinkish gray (7.5YR 6/2) very cobbly clay loam, brown (7.5YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common fine and many very fine tubular pores; common clay films on surfaces along pores, on rock fragments, and on all faces of peds; 20 percent gravel and 20 percent cobbles; strongly acid (pH 5.3); abrupt smooth boundary.

R—27 to 31 inches (68 to 78 centimeters); indurated rhyolite.

Reference Pedon Location

San Benito County, California; about 3,757 feet (1,145 meters) west of Bear Gulch Reservoir and 558 feet (170 meters) north of Bear Creek; 476 feet (145 meters) east and 755 feet (230 meters) south of the northwest corner of sec. 10, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 16.30 seconds north and longitude 121 degrees, 12 minutes, 15.90

Figure 14.—Reference profile of Argixerolls.

seconds west; UTM coordinates Zone 10, 660,874 meters Easting and 4,037,718 meters Northing.

Range in Characteristics

Depth to bedrock: 6 to 31 inches (15 to 80 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section: 18 to 55 percent clay and 0 to 80 percent rock fragments

A horizon:
Hue—10YR or 7.5YR
Value—4 or 5 dry; 2, 2.5, or 3 moist
Chroma—2 or 3 dry or moist
Texture of fine-earth fraction—clay, clay loam, sandy loam, or loam
Clay content—10 to 50 percent
Rock fragment content—0 to 50 percent, mostly gravel and cobbles
Reaction—strongly acid to neutral

Bt horizon:
Hue—10YR, 7.5YR, or 2.5YR
Value—5 or 6 dry; 2, 3, 4, or 5 moist
Chroma—2, 3, or 4 dry or moist
Texture of fine-earth fraction—clay, sandy clay loam, clay loam, loam, or sandy loam
Clay content—15 to 60 percent
Rock fragment content—0 to 80 percent, mostly gravel and cobbles
Reaction—strongly acid to neutral

Backdoor Series

The Backdoor series consists of soils that are deep to soft granite and are well drained. These soils formed in residuum derived from granite. They are on hills (fig. 15). Slopes range from 9 to 70 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Fine-loamy, mixed, active, thermic Typic Argixerolls

Typical Pedon Description

Backdoor loam on a west-facing hillslope of 38 percent under a cover of chamise and wedgeleaf ceanothus at an elevation of 1,936 feet (590 meters) (fig. 16). When described on June 7, 2006, the soil was slightly moist between depths of 10 and 31 inches (26 and 78 centimeters).

A1—0 to 5 inches (0 to 12 centimeters); dark grayish brown (10YR 4/2) loam, dark grayish brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many fine interstitial pores; 1 percent gravel; very strongly acid (pH 5.0); clear smooth boundary.

A2—5 to 10 inches (12 to 26 centimeters); grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, moderately sticky and very plastic; common very fine roots; common fine tubular pores and common very fine interstitial pores; 15 percent gravel; strongly acid (pH 5.5); clear smooth boundary.

Figure 15.—Typical area of a Backdoor soil.

Bt1—10 to 15 inches (26 to 39 centimeters); pale brown (10YR 6/3) gravelly clay loam, brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, very friable, moderately sticky and very plastic; common fine and very fine roots; common fine and very fine tubular pores; many faint clay films on surfaces of pores and on all faces of peds; 15 percent gravel; strongly acid (pH 5.3); clear wavy boundary.

Bt2—15 to 27 inches (39 to 68 centimeters); light yellowish brown (10YR 6/4) very paragravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse angular blocky structure; hard, very friable, moderately sticky and moderately plastic; common very fine, fine, and medium tubular pores; many faint clay films on all faces of peds, on surfaces of pores, and on rock fragments; 50 percent gravel; strongly acid (pH 5.3); gradual wavy boundary.

Crt—27 to 60 inches (68 to 153 centimeters); very pale brown (10YR 7/4) extremely paragravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; hard, friable, nonsticky and nonplastic; 10 percent discontinuous faint clay films on rock fragments; 80 percent paragravel; strongly acid (pH 5.3).

Typical Pedon Location

San Benito County, California; about 0.9 mile (1.4 kilometers) along California Highway 146 north of the west entrance to Pinnacles National Monument and on the east side of the highway; 1,958 feet south and 1,333 feet east of the northwest corner of sec. 5, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 58.20 seconds north and longitude 121 degrees, 13 minutes, 43.30 seconds west; UTM coordinates Zone 10, 658,661 meters Easting and 4,038,958 meters Northing.

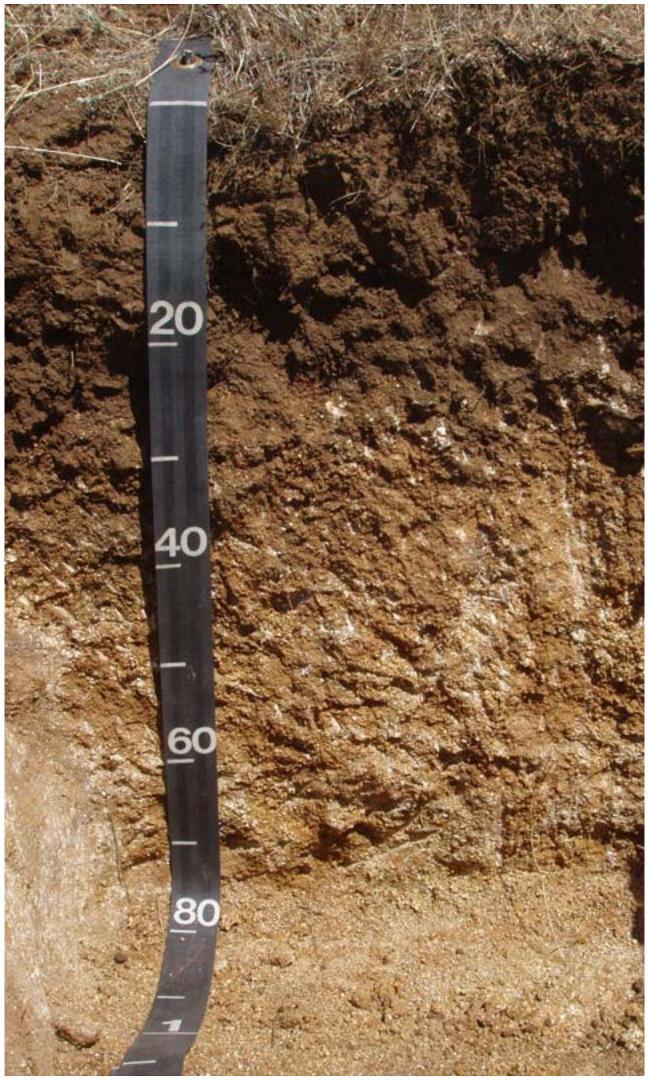


Figure 16.—Typical profile of a Backdoor soil.

Range in Characteristics

Depth to bedrock: More than 60 inches (150 centimeters)
Mean annual soil temperature: 61 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section: 25 to 30 percent clay and 5 to 25 percent rock fragments, mostly granite gravel
Base saturation by sum of cations: 87 to 100 percent

A horizon:
Hue—10YR or 7.5YR
Value—4 or 5 dry; 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture of fine-earth fraction—sandy loam or loam
Clay content—8 to 25 percent

Rock fragment content—5 to 15 percent gravel
Reaction—very strongly acid to slightly alkaline

Bt horizon:
Hue—7.5YR or 10YR
Value—5, 6, or 7 dry; 3, 4, or 5 moist
Chroma—3, 4, or 6 dry; 2, 3, 4, or 6 moist
Texture of fine-earth fraction—sandy clay loam or clay loam
Clay content—20 to 35 percent
Rock fragment content—5 to 50 percent paragravel
Reaction—very strongly acid to neutral

C horizon:
Hue—7.5YR or 10YR
Value—5, 6, or 7 dry; 3, 4, or 5 moist
Chroma—4 or 6 dry; 4 or 6 moist
Texture of fine-earth fraction—loamy sand, loamy coarse sand, or sandy loam
Clay content—5 to 20 percent
Rock fragment content—60 to 80 percent paragravel
Reaction—strongly acid to neutral

Burgundy Series

The Burgundy series consists of soils that are very shallow to bedrock and are well drained. These soils formed in residuum derived from rhyolite. They are on hills (fig. 17). Slopes range from 35 to 75 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Xerorthents

Typical Pedon Description

Burgundy extremely gravelly coarse sandy loam on a south-facing hillslope of 78 percent at an elevation of 1,447 feet (441 meters) (fig. 18). When described on January 13, 2005, the soil was moist throughout.

A1—0 to 1 inch (0 to 3 centimeters); brown (10YR 5/3) extremely gravelly coarse sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; many fine irregular pores; 65 percent gravel; moderately acid (pH 5.7); black macrobiotic crust covering 40 percent of surface; abrupt smooth boundary.

A2—1 to 6 inches (3 to 16 centimeters); brown (10YR 5/3) extremely gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine roots; many medium irregular pores; 65 percent gravel; moderately acid (pH 6.0); abrupt smooth boundary.

R—6 to 7 inches (16 to 18 centimeters); hard, massive rhyolite; fractured at intervals of less than 4 inches (10 centimeters).

Typical Pedon Location

San Benito County, California; about 0.5 mile (0.8 kilometer) along the High Peaks Trail, west of the Chalone Creek Maintenance Station; 1,574 feet north and 2,462 feet west of the southeast corner of sec. 35, T. 16 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 29 minutes, 32.90 seconds

Figure 17.—Typical area of a Burgundy soil.

Figure 18.—Typical profile of a Burgundy soil.

north and longitude 121 degrees, 10 minutes, 39.00 seconds west; UTM coordinates Zone 10, 663,236 meters Easting and 4,040,114 meters Northing.

Range in Characteristics

Depth to bedrock: 4 to 10 inches (9 to 25 centimeters)
Mean annual soil temperature: 71 to 76 degrees F (22 to 24 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days).
Particle-size control section: 10 to 15 percent clay; 40 to 70 percent rock fragments, mostly rhyolite gravel

A horizon:
Hue—10YR
Value—5 or 6 dry; 2, 3, or 4 moist
Chroma—2 or 3 dry; 2 or 3 moist
Texture of fine-earth fraction—coarse sandy loam
Clay content—10 to 15 percent
Rock fragment content—40 to 70 percent gravel
Reaction—very strongly acid to slightly alkaline
Base saturation (ammonium acetate)—70 percent

Casino Series

The Casino series consists of moderately deep, moderately well drained soils that formed in residuum derived from andesite. These soils are on hills (fig. 19). Slopes range from 20 to 70 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Fine, smectitic, thermic Pachic Argixerolls

Typical Pedon Description

Casino loam on a northeast-facing hillslope of 60 percent under a cover of blue oak and annual grasses at an elevation of 1,326 feet (404 meters) (fig. 20). When described on March 3, 2005, the soil was moist throughout.

A1—0 to 4 inches (0 to 9 centimeters); grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, moderately sticky and very plastic; many very fine roots; many very fine interstitial pores; 10 percent gravel; 100 percent base saturation by ammonium acetate; neutral (pH 7.1); clear wavy boundary.
A2—4 to 10 inches (9 to 26 centimeters); grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, very sticky and very plastic; many very fine roots; many very fine interstitial pores; 10 percent gravel; 97 percent base saturation by ammonium acetate; slightly alkaline (pH 7.1); gradual wavy boundary.
Bt1—10 to 20 inches (26 to 51 centimeters); brown (7.5YR 5/2) clay, dark brown (7.5YR 3/2) moist; moderate medium angular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine roots; many very fine tubular pores; many faint clay films on surfaces along pores and common faint clay films on all faces of peds; 5 percent gravel; 93 percent base saturation by ammonium acetate; slightly alkaline (pH 6.4); clear wavy boundary.
Bt2—20 to 37 inches (51 to 93 centimeters); brown (7.5YR 5/2) clay, brown (7.5YR 4/2) moist; moderate coarse angular blocky structure and moderate medium

Figure 19.—Typical area of a Casino soil.

angular blocky; very hard, very firm, very sticky and very plastic; common very fine and fine roots; many very fine tubular pores; many faint clay films on surfaces along pores and common faint clay films on all faces of peds; 94 percent base saturation by ammonium acetate; neutral (pH 6.3); abrupt wavy boundary.

R—37 inches (93 centimeters); indurated andesite; fractured at intervals of less than 4 inches (10 centimeters).

Typical Pedon Location

San Benito County, California; about 656 feet (200 meters) northwest of public restroom at the Bear Gulch Visitor Center, along the maintenance road at Pinnacles National Monument; 1,717 feet east and 2,211 feet south of the northwest corner of sec. 2, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 54.40 seconds north and 121 degrees, 10 minutes, 58.10 seconds west; UTM coordinates Zone 10, 662,788 meters Easting and 4,038,923 meters Northing.

Range in Characteristics

Depth to bedrock: 20 to 40 inches (50 to 100 centimeters)
Mean annual soil temperature: 61 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about June 15 through November 15 (150 days) and moist in all parts from about January 15 through April 15 (90 days)

Figure 20.—Typical profile of a Casino soil.

Particle-size control section: 38 to 60 percent clay and 0 to 35 percent andesite rock fragments
Base saturation by ammonium acetate: 93 to 100 percent

A horizon:
Hue—10YR, 5YR, or 7.5YR
Value—4 or 5 dry; 2 or 3 moist
Chroma—1 or 2 dry; 1, 2, or 3 moist
Texture of fine-earth fraction—loam or sandy clay loam
Clay content—30 to 38 percent
Rock fragment content—0 to 20 percent gravel
Reaction—strongly acid to slightly alkaline

Bt horizon:
Hue—10YR, 7.5YR, or 5YR
Value—5 dry; 2, 3, or 4 moist
Chroma—2 or 3 dry; 1, 2, or 3 moist
Texture of fine-earth fraction—clay or clay loam
Clay content—38 to 60 percent

Rock fragment content—0 to 25 percent gravel
Reaction—strongly acid to slightly alkaline

Chalone Series

The Chalone series consists of soils that are moderately deep to bedrock and are well drained. These soils formed in residuum derived from acidic volcanic breccia. They are on backslopes of hills (fig. 21). Slopes range from 35 to 70 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Loamy-skeletal, mixed, superactive, thermic Typic Haploxerepts

Typical Pedon Description

Chalone gravelly sandy loam on a northwest-facing hillslope of 66 percent at an elevation of 2,241 feet (683 meters) (fig. 22). When described on December 15, 2004, the soil was dry throughout.

Oi—0 to 1 inch (0 to 3 centimeters); woody, slightly decomposed plant material of oak leaves and twigs; abrupt smooth boundary.
Oe—1 to 3 inches (3 to 8 centimeters); dark grayish brown (10YR 4/2) moderately decomposed plant material, very dark brown (10YR 2/2) moist; abrupt smooth boundary.
A—3 to 8 inches (8 to 21 centimeters); dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; common very fine irregular pores; 30 percent gravel; strongly acid (pH 5.5); clear wavy boundary.

Figure 21.—Typical area of a Chalone soil.

Bw1—8 to 13 inches (21 to 33 centimeters); light brownish gray (10YR 6/2) extremely gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine and medium roots; many very fine irregular pores; 80 percent gravel; strongly acid (pH 5.5); clear wavy boundary.

Bw2—13 to 30 inches (33 to 77 centimeters); light gray (10YR 7/2) extremely gravelly sandy clay loam, grayish brown (10YR 5/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine irregular pores; 85 percent gravel; strongly acid (pH 5.5); abrupt wavy boundary.

R—30 to 33 inches (77 to 84 centimeters); hard rhyolitic breccia; fractures at intervals of less than 4 inches (10 centimeters).

Typical Pedon Location

San Benito County, California; about 98 feet (30 meters) north of High Peaks Trail, about 820 feet (250 meters) east of its intersection with Condor Gulch Trail, in Pinnacles National Monument; 636 feet west and 1,125 feet north of the southeast corner of sec. 34, T. 16 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 29 minutes, 27.30 seconds north and

Figure 22.—Typical profile of a Chalone soil.

longitude 121 degrees, 11 minutes, 12.10 seconds west; UTM coordinates Zone 10, 662,194 meters Easting and 4,039,925 meters Northing.

Range in Characteristics

Depth to bedrock: 20 to 40 inches (50 to 100 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about June 15 through November 15 (150 days) and moist in all parts from about January 15 through May 1 (105 days)
Particle-size control section: 5 to 25 percent clay and 35 to 80 percent gravel

A horizon:
Hue—7.5YR or 10YR
Value—4, 5, or 6 dry; 2 or 3 moist
Chroma—2 or 3 dry; 1, 2, or 3 moist
Texture of fine-earth fraction—sandy loam, loam, or loamy coarse sand
Clay content—3 to 22 percent
Rock fragment content—5 to 50 percent gravel
Reaction—strongly acid to slightly alkaline

Bw horizon:
Hue—7.5YR or 10YR
Value—6, 7, or 8 dry; 4, 5, or 6 moist
Chroma—2, 3, or 4 dry or moist
Texture of fine-earth fraction—loamy coarse sand, very fine sandy loam, sandy loam, coarse sandy loam, loam, or sandy clay loam
Clay content—5 to 25 percent
Rock fragment content—35 to 80 percent gravel
Reaction—strongly acid to neutral

Elder Series

The Elder series consists of very deep, well drained soils that formed in overbank deposits derived from volcanic and sedimentary rock. These soils are on treads of stream terraces in river valleys (fig. 23). Slopes range from 0 to 9 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 59 degrees F (16 degrees).

Taxonomic class: Coarse-loamy, mixed, superactive, thermic Cumulic Haploxerolls

Typical Pedon Description

Elder gravelly sandy loam on a southeast-facing stream terrace with a slope of 2 percent at an elevation of 352 meters (fig. 24). When described on May 11, 2005, the soil was moist throughout.

A1—0 to 3 inches (0 to 8 centimeters); grayish brown (10YR 5/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine moderate-continuity irregular pores; 25 percent gravel; neutral (pH 6.8); clear smooth boundary.

A2—3 to 12 inches (8 to 30 centimeters); brown (10YR 5/3) sandy loam, very dark brown (10YR 2/2) moist; weak coarse angular blocky structure; moderately hard, very friable, slightly sticky and slightly plastic; common very fine and medium roots; common very fine and fine moderate-continuity tubular pores; 10 percent gravel; neutral (pH 7.0); clear wavy boundary.

Figure 23.—Typical area of an Elder soil.

A3—12 to 24 inches (30 to 60 centimeters); grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure and weak coarse subangular blocky; moderately hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine moderate-continuity tubular pores; 10 percent gravel; neutral (pH 6.9); abrupt smooth boundary.

2C—24 to 33 inches (60 to 83 centimeters); light brownish gray (10YR 6/2) gravelly loamy coarse sand, brown (10YR 4/3) moist; weak medium subangular blocky structure and weak coarse subangular blocky; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine moderate-continuity irregular pores; 25 percent gravel; neutral (pH 7.0); abrupt smooth boundary.

3Ab—33 to 36 inches (83 to 92 centimeters); light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure and weak coarse subangular blocky; soft, very friable, moderately sticky and moderately plastic; common very fine roots; common very fine moderate-continuity tubular pores; 5 percent gravel; neutral (pH 7.0); abrupt smooth boundary.

4C—36 to 43 inches (92 to 109 centimeters); pale brown (10YR 6/3) gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; single grain; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine moderate-continuity irregular pores; 20 percent gravel; neutral (pH 7.0); abrupt smooth boundary.

5Ab—43 to 45 inches (109 to 115 centimeters); light brownish gray (10YR 6/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure and weak coarse subangular blocky; moderately hard, friable, very sticky and very plastic; common very fine roots; common very fine moderate-continuity irregular pores; 5 percent gravel; slightly alkaline (pH 7.6); abrupt smooth boundary.

6C—45 to 61 inches (115 to 155 centimeters); pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 4/3) moist; weak medium subangular blocky structure and weak coarse subangular blocky; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine moderate-continuity irregular pores; 30 percent gravel; slightly alkaline (pH 7.6).

Figure 24.—Typical profile of an Elder soil.

Typical Pedon Location

San Benito County, California; about 100 feet (30 meters) east of California Highway 146, 0.7 mile (1.2 kilometers) south of California Highway 25, in Pinnacles National Monument; 354 feet west and 2,688 feet south of the northeast corner of sec. 30, T. 16 S., R. 8 E.; USGS Bickmore Canyon, California, topographic quadrangle; latitude 36 degrees, 30 minutes, 36.50 seconds north and longitude 121 degrees, 8 minutes, 13.60 seconds west; UTM coordinates Zone 10, 666,819 meters Easting and 4,042,147 meters Northing.

Range in Characteristics

Depth to bedrock: More than 60 inches (150 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section (25 to 100 centimeters): 3 to 18 percent clay and 0 to 15 percent granite and rhyolite rock fragments

A horizon:
Hue—10YR
Value—4 or 5 dry; 2 or 3 moist
Chroma—2 or 3 dry; 2 or 3 moist
Texture of fine-earth fraction—sandy loam or coarse sandy loam
Clay content—7 to 15 percent
Rock fragment content—0 to 25 percent pebbles
Reaction—neutral or slightly alkaline (pH 6.8 to 7.8)

Ab horizon:
Hue—10YR
Value—5 or 6 dry; 3 moist
Chroma—2 dry or moist
Texture of fine-earth fraction—loam or clay loam
Clay content—0 to 5 percent
Reaction—neutral or slightly alkaline (pH 7.0 to 7.6)

C horizon:
Hue—10YR
Value—5, 6, or 7 dry; 4, 5, or 6 moist
Chroma—2, 3, or 4 dry; 3, 4, or 6 moist
Texture of fine-earth fraction—loamy coarse sand, coarse sandy loam, or sandy loam
Clay content—3 to 15 percent
Rock fragment content—5 to 35 percent pebbles
Reaction—neutral or slightly alkaline (pH 7.0 to 7.8)

Firstsister Series

The Firstsister series consists of very deep, well drained soils that formed in colluvium derived from rhyolite. These soils are on hills (fig. 25). Slopes range from 35 to 70 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Loamy-skeletal, mixed, superactive, thermic Pachic Haploxerolls

Figure 25.—Typical area of a Firstsister soil.

Typical Pedon Description

Firstsister extremely channery loam on a north-facing slope of 40 percent under a cover of live oak, California buckeye, and poison oak at an elevation of 1,050 feet (320 meters) (fig. 26). When described on June 16, 2005, the soil was dry between 2 and 8 inches (5 and 20 centimeters) and slightly moist between 8 and 60 inches (20 to 150 centimeters).

Oi—0 to 2 inches (0 to 5 centimeters); slightly decomposed plant material of leaves, buckeye balls, and small twigs; abrupt smooth boundary.

A1—2 to 8 inches (5 to 20 centimeters); very dark grayish brown (10YR 3/2) extremely channery loam, black (10YR 2/1) moist; moderate coarse granular structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine to very coarse roots; common very fine to medium irregular pores; 35 percent channers, 15 percent cobbles, and 10 percent stones; neutral (pH 7.2); clear wavy boundary.

A2—8 to 35 inches (20 to 89 centimeters); very dark grayish brown (10YR 3/2) extremely channery loam, black (10YR 2/1) moist; moderate fine and medium granular structure; slightly hard, very friable, moderately sticky and moderately plastic; common very fine to coarse roots; common very fine and fine irregular pores; 55 percent channers, 20 percent cobbles, and 10 percent flagstones; slightly alkaline (pH 7.4); clear wavy boundary.

Bw—35 to 59 inches (89 to 150 centimeters); brown (10YR 5/3) extremely channery coarse sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure and moderate coarse subangular blocky; slightly hard, very friable, moderately sticky and moderately plastic; common very fine to coarse roots; many very fine and common fine and medium irregular pores;

Figure 26.—Typical profile of a Firstsister soil.

55 percent channers, 20 percent flagstones, and 10 percent stones; slightly alkaline (pH 7.8).

Typical Pedon Location

San Benito County, California; about 0.6 mile (1 kilometer) east of the Bear Gulch Visitor Center, along Bear Gulch Trail, in Pinnacles National Monument; 463 feet west and 1,875 feet south of the northeast corner of sec. 2, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 59.00 seconds north and longitude 121 degrees, 10 minutes, 20.40 seconds west; UTM coordinates Zone 10, 663,724 meters Easting and 4,039,079 meters Northing, NAD 83.

Range in Characteristics

Depth to bedrock: More than 60 inches (150 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from June 15 through November 15 (150 days) and moist in all parts from about January 15 through May 1 (105 days)
Particle-size control section: 8 to 25 percent clay and 50 to 85 percent rhyolite rock fragments, mostly channers
Base saturation by ammonium acetate: 100 percent

A horizon:
Hue—10YR
Value—3, 4, or 5 dry; 2 or 3 moist
Chroma—2 or 3 dry; 1 or 2 moist
Texture of fine-earth fraction—sandy loam or loam
Clay content—5 to 20 percent
Rock fragment content—40 to 85 percent, mostly channers
Reaction—neutral or slightly alkaline

Bw horizon:
Hue—10YR
Value—5 or 6 dry; 2, 3, or 4 moist
Chroma—3 dry or moist
Texture of fine-earth fraction—sandy loam, loam, or sandy clay loam
Clay content—8 to 25 percent
Rock fragment content—50 to 85 percent, mostly channers
Reaction—neutral

Highpeaks Series

The Highpeaks series consists of soils that are shallow to a lithic contact and are well drained. These soils formed in residuum derived from igneous rock. They are on hills (fig. 27). Slopes range from 35 to 70 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Loamy-skeletal, mixed, superactive, thermic Lithic Haploxerolls

Figure 27.—Typical area of a Highpeaks soil.

Typical Pedon Description

Highpeaks very gravelly coarse sandy loam on a north-facing mountainslope of 50 percent under hollyleaf cherry and buckbrush (fig. 28). When described on January 20, 2005, the soil was moist throughout.

Oi—0 to 2 inches (0 to 4 centimeters); slightly decomposed plant material consisting of leaves and twigs; clear wavy boundary.

A1—2 to 5 inches (4 to 12 centimeters); dark gray (10YR 4/1) gravelly coarse sandy loam, black (10YR 2/1) moist; weak fine subangular blocky structure; very friable, slightly sticky and nonplastic; many very fine roots; many very fine irregular pores; 30 percent gravel; moderately acid (pH 5.9); clear wavy boundary.

A2—5 to 13 inches (12 to 34 centimeters); dark gray (10YR 4/1) very gravelly coarse sandy loam, black (10YR 2/1) moist; weak fine subangular blocky structure; friable, slightly sticky and nonplastic; common very fine and fine roots; many very fine irregular pores; 40 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

Cr—13 to 21 inches (34 to 53 centimeters); hard, fractured andesite.

R—21 inches (53 centimeters); massive andesite.

Figure 28.—Typical profile of a Highpeaks soil.

Typical Pedon Location

San Benito County, California; about 1,800 feet (545 meters) west of Bench Trail, along Bear Gulch Trail, and 30 feet (10 meters) south of Bench Trail; 160 feet west and 2,000 feet south of the northeast corner of sec. 2, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 56.90 seconds north and longitude 121 degrees, 10 minutes, 16.40 seconds west; UTM coordinates Zone 10, 663,815 meters Easting and 4,039,029 meters Northing.

Range in Characteristics

Depth to bedrock: 10 to 20 inches (25 to 50 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry from mid-June through mid-November
Particle-size control section: Averages 15 to 25 percent clay and 35 to 75 percent rock fragments, mostly gravel
Base saturation by ammonium acetate: 89 to 98 percent

A horizon:
Hue—10YR
Value—3, 4, or 5 dry; 2 or 3 moist
Chroma—1, 2, or 3 dry or moist
Texture of fine-earth fraction—coarse sandy loam or loam
Clay content—15 to 25 percent
Rock fragment content—35 to 55 percent gravel
Reaction—moderately acid to neutral

Knuckle Series

The Knuckle series consists of soils that are shallow to bedrock and are somewhat excessively drained. These soils formed in rhyolite. They are on hills (fig. 29). Slopes range from 35 to 70 percent. The mean annual precipitation is about

Figure 29.—Typical area of a Knuckle soil on south aspects. Chalone soil is on north aspects.

17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Sandy-skeletal, mixed, thermic Lithic Xerorthents

Typical Pedon Description

Knuckle loamy sand on a southeast-facing hillslope of 66 percent under a cover of chamise at an elevation of 2,300 feet (699 meters) (fig. 30). When described on October 25, 2005, the soil was dry throughout.

A—0 to 2 inches (0 to 4 centimeters); grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine irregular pores; 10 percent gravel; strongly acid (pH 5.1); abrupt smooth boundary.

Bw1—2 to 8 inches (4 to 20 centimeters); light yellowish brown (10YR 6/4) very gravelly loamy sand, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; many very fine irregular pores; 35 percent gravel; neutral (pH 6.9); clear wavy boundary.

C—8 to 12 inches (20 to 30 centimeters); light yellowish brown (10YR 6/4) extremely stony loamy sand, dark yellowish brown (10YR 4/4) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine and many medium roots; many very fine irregular pores; 15 percent gravel,

Figure 30.—Typical profile of a Knuckle soil.

25 percent cobbles, and 45 percent stones; neutral (pH 6.9); gradual irregular boundary.
R—12 to 23 inches (30 to 58 centimeters); indurated rhyolite.

Typical Pedon Location

San Benito County, California; 6,400 feet (1,940 meters) south along the Chalone Peak Trail, from Bear Creek Reservoir, and 50 feet (15 meters) southeast of the trail; 230 feet north and 770 feet east of the southwest corner of sec. 11, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 27 minutes, 30.40 seconds north and longitude 121 degrees, 11 minutes, 11.10 seconds west; UTM coordinates Zone 10, 662,539 meters Easting and 4,036,450 meters Northing.

Range in Characteristics

Depth to bedrock: 6 to 20 inches (16 to 50 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section: 2 to 15 percent clay and 35 to 60 percent rhyolite rock fragments

A horizon:
Hue—10YR
Value—5 or 6 dry; 3 moist
Chroma—2 or 3 dry or moist
Texture of fine-earth fraction—sandy loam or loamy sand
Clay content—2 to 10 percent
Rock fragment content—10 to 40 percent gravel
Reaction—strongly acid to slightly acid

Bw horizon:
Hue—10YR or 7.5YR
Value—6 or 7 dry; 3 or 4 moist
Chroma—2, 3, or 4 dry or moist
Texture of fine-earth fraction—loamy sand
Clay content—2 to 15 percent
Rock fragment content—35 to 85 percent, mostly gravel, cobbles, and stones
Reaction—moderately acid to neutral

Longsfolly Series

The Longsfolly series consists of soils that are deep to soft fanglomerate and are somewhat excessively drained. These soils formed in colluvium over residuum derived from fanglomerate. They are on hills (fig. 31). Slopes range from 15 to 50 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Sandy, mixed, thermic Entic Haploxerolls

Typical Pedon Description

Longsfolly loamy sand on an east-facing hillslope under a stand of chamise chaparral at an elevation of 1,680 feet (511 meters) (fig. 32).

A1—0 to 4 inches (0 to 10 centimeters); grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft,

Figure 31.—Typical area of a Longsfolly soil.

very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 10 percent gravel; slightly acid (pH 6.1); clear wavy boundary.

A2—4 to 16 inches (10 to 40 centimeters); light brownish gray (10YR 6/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and common fine, medium, and coarse roots; many very fine irregular pores; 10 percent gravel; slightly acid (pH 6.3); clear wavy boundary.

C1—16 to 28 inches (40 to 70 centimeters); light gray (10YR 7/2) gravelly loamy coarse sand, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine to medium roots; many very fine irregular pores; 30 percent gravel; moderately acid (pH 5.8); gradual wavy boundary.

C2—28 to 50 inches (70 to 127 centimeters); very pale brown (10YR 8/3) gravelly loamy sand, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine to medium roots; common very fine irregular pores; 30 percent gravel; moderately acid (pH 5.9); gradual wavy boundary.

Cr—50 to 63 inches (127 to 160 centimeters); soft, massive fanglomerate; fractured at intervals of less than 4 inches (10 centimeters).

Typical Pedon Location

San Benito County, California; about 3,800 feet (1,155 meters) northeast of the Chalone Creek Maintenance Station; 640 feet east and 620 feet south of the northwest corner of sec. 36, T. 16 S., R. 7 E.; USGS Bickmore Canyon, California, topographic quadrangle; latitude 36 degrees, 30 minutes, 1.70 seconds north and

Figure 32.—Typical profile of a Longsfolly soil.

longitude 121 degrees, 9 minutes, 59.10 seconds west; UTM coordinates Zone 10, 664,214 meters Easting and 4,041,021 meters Northing.

Range in Characteristics

Depth to paralithic contact: 40 to 60 inches (100 to 150 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about June 15 through November 15 (150 days) and moist in all parts from about January 15 through May 1 (105 days)
Particle-size control section: 2 to 5 percent clay and 15 to 35 percent gravel
Reaction: Moderately acid to slightly alkaline
Base saturation by ammonium acetate: 83 to 90 percent

A horizon:
Hue—10YR
Value—3 to 6 dry; 2 or 3 moist

Chroma—2 or 3 dry or moist
Texture of fine-earth fraction—loamy sand or loamy coarse sand
Clay content—2 to 5 percent
Rock fragment content—5 to 35 percent gravel

C horizon:
Hue—10YR
Value—5 to 8 dry; 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture of fine-earth fraction—loamy sand or loamy coarse sand
Clay content—2 to 5 percent
Rock fragment content—5 to 40 percent

Ordeal Series

The Ordeal series consists of soils that are moderately deep to soft bedrock and are somewhat excessively drained. These soils formed in colluvium over residuum derived from fanglomerate or sandstone. They are on hills (fig. 33). Slopes range from 20 to 75 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Sandy-skeletal, mixed, thermic Entic Haploxerolls

Typical Pedon Description

Ordeal loamy sand on a southeast-facing hillslope of 40 percent under a cover of chamise and annual grasses at an elevation of 1,660 feet (506 meters)

Figure 33.—Typical area of an Ordeal soil.

(fig. 34). When described on January 19, 2005, the soil was moist to a depth of 7 inches (19 centimeters).

A1—0 to 6 inches (0 to 15 centimeters); brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine irregular pores; 10 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

A2—6 to 14 inches (15 to 35 centimeters); brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 10 percent gravel; neutral (pH 7.0); clear wavy boundary.

C1—14 to 23 inches (35 to 58 centimeters); pale brown (10YR 6/3) gravelly loamy sand, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine irregular pores; 30 percent gravel; neutral (pH 7.0); clear wavy boundary.

C2—23 to 36 inches (58 to 92 centimeters); pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; weak medium subangular blocky structure;

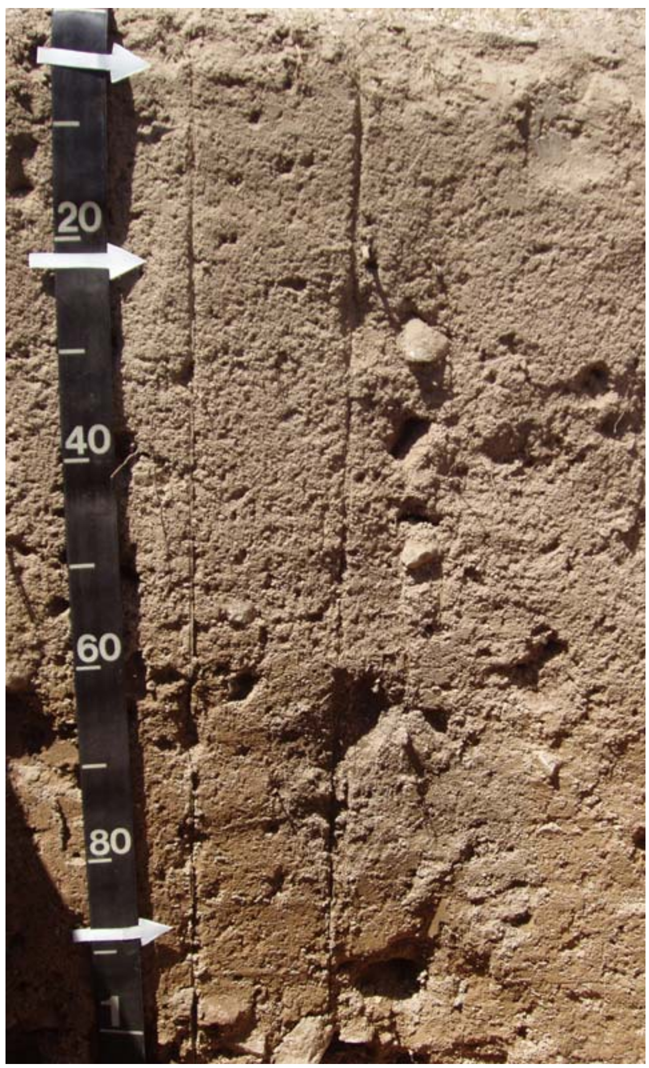


Figure 34.—Typical profile of an Ordeal soil.

slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine irregular pores; 35 percent gravel and 30 percent cobbles; neutral (pH 7.0); abrupt wavy boundary.

Cr—36 to 40 inches (92 to 102 centimeters); moderately cemented fanglomerate; fractured at intervals of less than 4 inches (10 centimeters).

Typical Pedon Location

San Benito County, California; about 1.5 miles (2.4 kilometers) northeast of the Chalone Creek Maintenance Station, in Pinnacles National Monument; 605 feet east and 708 feet south of the northwest corner of sec. 36, T. 16 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 30 minutes, 1.00 second north and longitude 121 degrees, 9 minutes, 56.40 seconds west; UTM coordinates Zone 10, 664,278 meters Easting and 4,041,002 meters Northing.

Range in Characteristics

Depth to bedrock: 20 to 40 inches (50 to 100 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section: 5 percent clay and 48 percent rock fragments
Base saturation by ammonium acetate: 85 to 98 percent

A horizon:
Hue—10YR
Value—5 dry; 3 moist
Chroma—2 or 3 dry or moist
Texture of fine-earth fraction—sandy loam, coarse sandy loam, loamy sand, loamy coarse sand, or coarse sand
Clay content—2 to 10 percent
Rock fragment content—2 to 20 percent gravel
Reaction—strongly acid or neutral

Oxyaquic Haploxerolls

Oxyaquic Haploxerolls consists of very deep, moderately well drained or somewhat poorly drained soils that formed in alluvium derived from rhyolite and granite. These soils are on narrow stream terraces (fig. 35). Slopes range from 0 to 5 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Oxyaquic Haploxerolls

Reference Pedon Description

Oxyaquic Haploxerolls sandy loam on a southeast-facing terrace with a slope of 3 percent under a cover of willows, grasses, and forbs at an elevation of 1,380 feet (422 meters) (fig. 36). When described on January 8, 2006, the soil was moist below a depth of 2 inches (4 centimeters).

A1—0 to 2 inches (0 to 4 centimeters); grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine roots; many very fine irregular pores; 5 percent gravel; slightly alkaline (pH 7.5); clear smooth boundary.

Figure 35.—Typical area of Oxyaquic Haploxerolls.

A2—2 to 11 inches (4 to 27 centimeters); brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and common fine and medium roots; many very fine irregular pores; 5 percent gravel; neutral (pH 7.0); abrupt wavy boundary.

2A1—11 to 14 inches (27 to 35 centimeters); grayish brown (10YR 5/2) very gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; many very fine irregular pores; 50 percent gravel; slightly alkaline (pH 7.5); abrupt wavy boundary.

2A2—14 to 26 inches (35 to 65 centimeters); grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and common fine and medium roots; many very fine irregular pores; 20 percent gravel; slightly alkaline (pH 7.5); abrupt smooth boundary.

2A3—26 to 33 inches (65 to 85 centimeters); brown (10YR 5/3) very gravelly loamy coarse sand, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; many very fine and common fine and medium roots; many very fine irregular pores; 30 percent gravel and 25 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

2A4—33 to 37 inches (85 to 95 centimeters); brown (10YR 5/3) extremely cobbly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and common fine roots; many very fine irregular pores; 25 percent gravel and 40 percent cobbles; slightly alkaline (pH 7.5); abrupt wavy boundary.

2C—37 to 60 inches (95 to 150 centimeters); light yellowish brown (10YR 6/4) extremely cobbly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; single grain; loose, nonsticky and nonplastic; common very fine to medium roots;

Figure 36.—Reference profile of Oxyaquic Haploxerolls.

many very fine irregular pores; 50 percent gravel and 30 percent cobbles; moderately alkaline (pH 8.0).

Reference Pedon Location

San Benito County, California, about 1,120 feet (340 meters) southwest of the Chaparral Ranger Station and 15 feet (5 meters) northwest of California Highway 146; 165 feet west and 1,900 feet south of the northeast corner of sec. 2, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 29 minutes, 19.10 seconds north and longitude 121 degrees, 12 minutes, 42.50 seconds west; UTM coordinates Zone 10, 660,174 meters Easting and 4,039,635 meters Northing.

Range in Characteristics

Depth to bedrock: More than 60 inches (150 centimeters)
Mean annual soil temperature: 59 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about June 15 through November 15 (150 days) and moist in all parts from about January 15 through May 1 (105 days)
Particle-size control section: 1 to 38 percent clay and 0 to 72 percent rock fragments
Depth to seasonal high water table: 20 to 40 inches (50 to 100 centimeters)

A horizon:
Hue—neutral, 2.5Y, or 10YR
Value—3, 4, or 5 dry; 2, 2.5, or 3 moist
Chroma—1, 2, or 3 dry or moist
Texture of fine-earth fraction—clay, silty clay loam, fine sandy loam, sandy loam, coarse sandy loam, loamy coarse sand, or sand
Clay content—3 to 45 percent
Rock fragment content—0 to 30 percent gravel
Reaction—very strongly acid to strongly alkaline

2A horizon:
Hue—2.5Y or 10YR
Value—4 or 5 dry; 2 or 3 moist
Chroma—1, 2, or 3 dry or moist
Redoximorphic features (where present)—iron-manganese masses with hue of 10YR, value of 4 moist, and chroma of 6 moist
Texture of fine-earth fraction—fine sandy loam, sandy loam, coarse sandy loam, or loamy coarse sand
Clay content—3 to 30 percent
Rock fragment content—20 to 70 percent, mostly gravel and cobbles
Reaction—strongly acid to strongly alkaline

C horizon:
Hue—5Y, 2.5Y, or 10YR
Value—4, 5, 6, or 7 dry; 2, 4, or 5 moist
Chroma—1, 2, 3, or 4 dry or moist
Redoximorphic features (where present)—iron-manganese masses with hue of 10YR, value of 4 moist, and chroma of 6 moist
Texture of fine-earth fraction—silty clay loam, sandy clay loam, loam, fine sandy loam, sandy loam, coarse sandy loam, loamy coarse sand, sand, or coarse sand
Clay content—1 to 35 percent
Rock fragment content—0 to 85 percent, including gravel, cobbles, and stones
Reaction—very strongly acid to moderately alkaline

Passion Series

The Passion series consists of soils that are shallow to soft bedrock and are somewhat excessively drained. These soils formed in colluvium over residuum derived from fanglomerate or sandstone. They are on hills. Slopes range from 20 to 75 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Sandy-skeletal, mixed, thermic, shallow Typic Xerorthents

Typical Pedon Description

Passion loamy sand on a south-facing hillslope of 10 percent under a cover of chamise and annual grasses at an elevation of 1,670 feet (510 meters). When described on January 19, 2005, the soil was moist to a depth of 7 inches (19 centimeters).

A1—0 to 3 inches (0 to 8 centimeters); grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and nonplastic; many very fine roots; many very fine irregular pores; 10 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

A2—3 to 7 inches (8 to 18 centimeters); brown (10YR 5/3) gravelly loamy sand, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine roots; many very fine irregular pores; 25 percent gravel; neutral (pH 7.0); clear wavy boundary.
C—7 to 16 inches (18 to 41 centimeters); light yellowish brown (10YR 6/4) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 40 percent gravel; neutral (pH 7.0); clear wavy boundary.
Cr—16 to 61 inches (41 to 155 centimeters); moderately cemented fanglomerate; fractured at intervals of less than 4 inches (10 centimeters).

Typical Pedon Location

San Benito County, California; about 2,600 feet (780 meters) east of the Chalone Creek Maintenance Station; 2,050 feet east and 1,200 feet north of the southwest corner of sec. 36, T. 16 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 30 minutes, 0.60 second north and longitude 121 degrees, 9 minutes, 59.30 seconds west; UTM coordinates Zone 10, 664,214 meters Easting and 4,040,996 meters Northing.

Range in Characteristics

Depth to paralithic contact: 10 to 20 inches (25 to 50 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Reaction: Slightly acid to slightly alkaline throughout
Particle-size control section: 4 to 10 percent clay and 40 to 55 percent coarse fragments, mostly gravel

A horizon:
Hue—10YR
Value—5 or 6 dry; 3 or 4 moist
Chroma—2 to 4 dry or moist
Texture of fine-earth fraction—sandy loam or loamy sand
Clay content—2 to 10 percent
Rock fragment content—5 to 35 percent gravel

C horizon, where present:
Hue—10YR
Value—5 or 6 dry; 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture of fine-earth fraction—loamy sand, loamy coarse sand, or sandy loam
Clay content—2 to 10 percent
Rock fragment content—35 to 55 percent gravel

Pinnacles Series

The Pinnacles series consists of soils that are moderately deep to soft bedrock and are well drained. These soils formed in residuum derived from sandstone. They are on hills. Slopes range from 5 to 75 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Fine, smectitic, thermic Ultic Palexeralfs

Typical Pedon Description

Pinnacles coarse sandy loam on a south-facing hillslope of 40 percent under a cover of annual grasses and forbs at an elevation of 1,300 feet (402 meters) (fig. 37). When described, the soil was dry throughout.

A1—0 to 8 inches (0 to 20 centimeters); light brownish gray (10YR 6/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine interstitial pores; moderately acid (pH 5.8); clear smooth boundary.

A2—8 to 12 inches (20 to 30 centimeters); light brownish gray (10YR 6/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine interstitial pores; moderately acid (pH 5.8); abrupt smooth boundary.

Bt—12 to 25 inches (30 to 64 centimeters); brown (7.5YR 5/4) sandy clay, brown (7.5YR 4/4) moist; strong coarse prismatic structure parting to strong medium

Figure 37.—Typical profile of a Pinnacles soil.

angular blocky; very hard, very firm, moderately sticky and moderately plastic; common very fine and fine roots; common very fine and fine tubular pores; many clay films on surfaces along pores and on all faces of peds; strongly acid (pH 5.3); clear smooth boundary.

Cr—25 to 60 inches (64 to 152 centimeters); moderately cemented sandstone.

Typical Pedon Location

San Benito County, California; about 3,000 feet (915 meters) northeast of Horse Valley Road, on Rosas Canyon Road, and 165 feet (50 meters) west of Rosas Canyon Road; 1,200 feet west of the southeast corner of sec. 8, T. 16 S., R. 3 E.; USGS Topo Valley, California, topographic quadrangle; latitude 36 degrees, 27 minutes, 30.70 seconds north and longitude 121 degrees, 7 minutes, 18.40 seconds west; UTM coordinates Zone 10, 668,297 meters Easting and 4,036,443 meters Northing.

Range in Characteristics

Depth to soft bedrock: 25 to 40 inches (64 to 100 centimeters)
Mean annual soil temperature: 61 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section: 35 to 60 percent clay and 5 to 35 percent sandstone rock fragments

A horizon:
Hue—10YR or 7.5YR
Value—5, 6, or 7 dry; 3, 4, or 5 moist
Chroma—2 or 3 dry; 2, 3, or 4 moist
Texture of fine-earth fraction—coarse sandy loam or sandy loam
Clay content—10 to 20 percent
Rock fragment content—0 to 30 percent, mostly gravel and cobbles
Reaction—moderately acid or slightly acid

Bt horizon:
Hue—10YR, 7.5YR, or 5YR
Value—5, 6, or 7 dry; 4 or 6 moist
Chroma—2, 3, or 4 dry; 3 or 4 moist
Texture of fine-earth fraction—clay loam, sandy clay, or clay
Clay content—35 to 55 percent
Rock fragment content—0 to 35 percent gravel
Reaction—very strongly acid to moderately acid

Pinncamp Series

The Pinncamp series consists of very deep, somewhat excessively drained soils that formed in alluvium derived from igneous rock. These soils are on stream terraces (fig. 38). Slopes range from 0 to 5 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Mixed, thermic Psammentic Haploxerolls

Typical Pedon Description

Pinncamp gravelly coarse sand under a canopy of live oak on a 1-percent slope at an elevation of 980 feet (300 meters) (fig. 39).

Figure 38.—Typical area of a Pinncamp soil.

Oi—0 to 2 inches (0 to 5 centimeters); woody, slightly decomposed plant material of oak leaves and twigs; abrupt smooth boundary.

Oe—2 to 4 inches (5 to 10 centimeters); peaty, moderately decomposed plant material; neutral (pH 6.9); abrupt smooth boundary.

A1—4 to 12 inches (10 to 30 centimeters); grayish brown (10YR 5/2) gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; moderate very coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common medium and fine roots; many fine irregular pores; 15 percent gravel; moderately acid (pH 5.8); clear wavy boundary.

A2—12 to 22 inches (30 to 56 centimeters); grayish brown (10YR 5/2) gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; moderate coarse and very coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine to coarse roots; many fine irregular pores; 15 percent gravel; moderately acid (pH 6.0); clear wavy boundary.

A3—22 to 36 inches (56 to 91 centimeters); brown (10YR 5/3) loamy coarse sand, dark grayish brown (10YR 4/2) moist; moderate coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine irregular pores; 10 percent gravel; slightly acid (pH 6.3); clear wavy boundary.

C—36 to 64 inches (91 to 162 centimeters); pale brown (10YR 6/3) loamy coarse sand, brown (10YR 5/3) moist; moderate medium subangular blocky structure; loose, nonsticky and nonplastic; common fine roots; many fine irregular pores; 10 percent gravel; slightly acid (pH 6.2).

Typical Pedon Location

San Benito County, California; about 80 feet (25 meters) south of California Highway 146 and fire lane leading to South Wilderness Trail; 1,280 feet west and

Figure 39.—Typical profile of a Pinncamp soil.

2,500 feet south of the northeast corner of sec. 1, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 52.20 seconds north and longitude 121 degrees, 9 minutes, 25.70 seconds west; UTM coordinates Zone 10, 665,077 meters Easting and 4,038,905 meters Northing.

Range in Characteristics

Depth to bedrock: More than 60 inches (155 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Reaction: Moderately acid to slightly alkaline throughout
Particle-size control section: 4 to 10 percent clay and 40 to 55 percent coarse fragments, mostly gravel
Base saturation by ammonium acetate: 86 to 100 percent

A horizon:
Hue—10YR
Value—4 or 5 dry; 2 or 3 moist
Chroma—2 or 3 dry or moist

Texture of fine-earth fraction—coarse sandy loam, loamy sand, loamy coarse sand, or coarse sand
Clay content—2 to 10 percent
Rock fragment content—5 to 20 percent gravel

C horizon:
Hue—10YR
Value—4 or 5 dry; 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture of fine-earth fraction—loamy sand or loamy coarse sand
Clay content—2 to 10 percent
Rock fragment content—5 to 30 percent gravel

Rimtrail Series

The Rimtrail series consists of very deep, well drained soils that formed in alluvium derived from granite. These soils are on valley floors (fig. 40). Slopes range from 0 to 5 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Fine-loamy, mixed, superactive, thermic Pachic Argixerolls

Typical Pedon Description

Rimtrail sandy loam under a stand of annual grasses and forbs on a valley floor with slopes of 3 percent at an elevation of 540 feet (164 meters) (fig. 41). When described on December 12, 2005, the soil was moist throughout.

A1—0 to 2 inches (0 to 5 centimeters); grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft,

Figure 40.—Typical area of a Rimtrail soil.

Figure 41.—Typical profile of a Rimtrail soil.

very friable, slightly sticky and nonplastic; many very fine roots; many very fine irregular pores; neutral (pH 7.0); clear smooth boundary.

A2—2 to 11 inches (5 to 28 centimeters); brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 5 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

A3—11 to 22 inches (28 to 55 centimeters); brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine tubular pores; 5 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

Bt1—22 to 29 inches (55 to 73 centimeters); very pale brown (10YR 7/4) sandy clay loam, yellowish brown (10YR 5/4) moist; moderate coarse angular blocky structure; hard, very friable, moderately sticky and moderately plastic; common very fine roots; many very fine and common fine tubular pores; common clay films between sand grains; 5 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

Bt2—29 to 45 inches (73 to 115 centimeters); light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist; strong medium prismatic structure; hard, firm, moderately sticky and very plastic; few fine roots; many very fine tubular pores; many clay films on all faces of peds and on surfaces along pores; 5 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

Bt3—45 to 60 inches (115 to 150 centimeters); light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist; strong coarse angular blocky structure; very hard, very firm, moderately sticky and very plastic; few fine roots; many very fine tubular pores; many clay films on all faces of peds and many clay films on surfaces along pores; 5 percent gravel; slightly acid (pH 6.5).

Typical Pedon Location

San Benito County, California; about 620 feet (190 meters) west of California Highway 146 on road to Lopez Canyon and 50 feet (15 meters) north of the road; 660 feet south and 330 feet east of the northwest corner of sec. 5, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 29 minutes, 11.00 seconds north and longitude 121 degrees, 13 minutes, 57.20 seconds west; UTM coordinates Zone 10, 658,319 meters Easting and 4,039,351 meters Northing.

Range in Characteristics

Depth to bedrock: More than 60 inches (155 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Reaction: Neutral or slightly alkaline throughout
Particle-size control section: 20 to 35 percent clay and 15 to 35 percent coarse fragments, mostly gravel
Base saturation by sum of cations: 94 to 100 percent

A horizon:
Hue—10YR
Value—4 or 5 dry; 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture of fine-earth fraction—loam or sandy loam
Clay content—10 to 18 percent
Rock fragment content—5 to 20 percent gravel

Bt horizon:
Hue—10YR
Value—5 or 6 dry; 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture of fine-earth fraction—sandy clay loam or clay loam
Clay content—28 to 35 percent
Rock fragment content—5 to 35 percent gravel

Santa Lucia Series

The Santa Lucia series consists of shallow, well drained soils that formed in residuum derived from acid shale. These soils are on hills (fig. 42). Slopes range from 30 to 75 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C). The Santa Lucia soils in this survey area are a taxadjunct to the series because they are shallow.

Taxonomic class: Loamy-skeletal, mixed, superactive, thermic Lithic Ultic Haploxerolls

Figure 42.—Typical area of a Santa Lucia soil.

Typical Pedon Description

Santa Lucia channery loam on a northeast-facing hillslope of 38 percent under chamise at an elevation of 1,400 feet (433 meters) (fig. 43).

A1—0 to 4 inches (0 to 10 centimeters); gray (10YR 5/1) channery loam, very dark gray (10YR 3/1) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine tubular pores and few very fine and fine interstitial pores; 25 percent channers; moderately acid (pH 5.8); clear smooth boundary.

A2—4 to 14 inches (10 to 36 centimeters); gray (10YR 5/1) very channery loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common fine and medium interstitial pores; 45 percent channers; moderately acid (pH 5.8); gradual smooth boundary.

R—14 to 18 inches (36 to 46 centimeters); strongly cemented acid shale; fractured at intervals of less than 4 inches (10 centimeters).

Typical Pedon Location

San Benito County, California, on a hillside 90 feet (27 meters) west of California Highway 25 on ranch road, 1,200 feet (370 meters) north of Jef Schmidt's house; 850 feet west and 2,400 feet south of the northeast corner of sec. 11, T. 16 S., R. 7 E.; USGS Bickmore Canyon, California, topographic quadrangle; latitude 36 degrees, 33 minutes, 13.60 seconds north and longitude 121 degrees, 10 minutes, 10.40 seconds west; UTM coordinates Zone 10, 663,821 meters Easting and 4,046,933 meters Northing.

Figure 43.—Typical profile of Santa Lucia soil.

Range in Characteristics

Depth to bedrock: 8 to 18 inches (20 to 46 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section: 18 to 27 percent clay and 35 to 60 percent shale rock fragments

A1 horizon:
Hue—10YR
Value—4 or 5 dry; 3 or 4 moist
Chroma—1 or 2 dry or moist
Texture of fine-earth fraction—loam
Clay content—25 percent
Rock fragment content—15 to 60 percent channers
Reaction—moderately acid or slightly acid (pH 5.6 to 6.5)

Still Series

The Still series consists of very deep, well drained soils that formed in alluvium derived from volcanic and sedimentary rock. These soils are on stream terraces (fig. 44). Slopes range from 0 to 2 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C). The Still soils in this survey area are a taxadjunct to the series because they are silty clay loam and strongly effervescent or violently effervescent below a depth of 40 inches.

Taxonomic class: Fine-loamy, mixed, superactive, thermic Cumulic Haploxerolls

Typical Pedon Description

Still loamy coarse sand on a stream terrace with a 0.5-percent slope under a live oak riparian forest at an elevation of 1,020 feet (312 meters) (fig. 45). When described on June 13, 2005, the soil was moist throughout.

Oi—0 to 3 inches (0 to 8 centimeters); slightly decomposed plant material of oak leaves and small twigs; abrupt smooth boundary.

A1—3 to 9 inches (8 to 23 centimeters); grayish brown (10YR 5/2) loamy coarse sand, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many very fine

Figure 44.—Typical area of a Still soil.

Figure 45.—Typical profile of a Still soil.

and common medium roots; common very fine, fine, and medium tubular pores; 5 percent gravel; neutral (pH 7.3); clear smooth boundary.

A2—9 to 21 inches (23 to 54 centimeters); gray (10YR 5/1) gravelly sandy loam, very dark gray (10YR 3/1) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine and common fine, medium, and coarse roots; common very fine, fine, medium, and coarse tubular pores; 20 percent gravel; moderately alkaline (pH 7.9); clear smooth boundary.

A3—21 to 31 inches (54 to 79 centimeters); grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate coarse and medium subangular blocky structure; slightly hard, very friable, very sticky and very plastic; common very fine, fine, and medium roots; common very fine, medium, and coarse tubular pores; 25 percent gravel; moderately alkaline (pH 7.9); clear wavy boundary.

A4—31 to 38 inches (79 to 97 centimeters); grayish brown (10YR 5/2) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure; hard, very friable, moderately sticky and moderately plastic; common very fine and medium roots; common very fine and coarse and many medium tubular pores; 25 percent gravel; very slightly effervescent; moderately alkaline (pH 8.1); clear wavy boundary.

A5—38 to 47 inches (97 to 120 centimeters); grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; hard, very friable, moderately sticky and very plastic; common very fine and medium roots; common very fine and medium and many fine tubular pores; 10 percent gravel; very slightly effervescent; moderately alkaline (pH 8.1); clear wavy boundary.

2Btk1—47 to 59 inches (120 to 151 centimeters); gray (2.5Y 5/1) clay loam, very dark gray (2.5Y 3/1) moist; strong coarse prismatic structure; very hard, friable, moderately sticky and very plastic; common very fine, fine, and medium roots; common very fine, fine, and medium tubular pores; common clay films on all faces of peds and on surfaces along pores; 5 percent fine carbonate masses lining pores; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

2Btk2—59 to 65 inches (151 to 165 centimeters); light gray (2.5Y 7/1) silty clay loam, gray (2.5Y 5/1) moist; moderate medium angular blocky structure; very hard, friable, moderately sticky and very plastic; common very fine roots; many very fine and fine tubular pores; few continuous distinct clay films on surfaces along pores and on all faces of peds; 20 percent fine carbonate masses lining pores; violently effervescent; moderately alkaline (pH 8.0).

Typical Pedon Location

San Benito County, California; about 980 feet (300 meters) east of the entrance to Pinnacles Campground, on California Highway 146; 2,200 feet south and 1,700 feet east of the northwest corner of sec. 31, T. 16 S., R. 8 E.; USGS San Benito, California, topographic quadrangle; latitude 36 degrees, 29 minutes, 38.10 seconds north and longitude 121 degrees, 8 minutes, 42.10 seconds west; UTM coordinates Zone 10, 666,139 meters Easting and 4,040,329 meters Northing.

Range in Characteristics

Depth to bedrock: More than 60 inches (150 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about June 15 through November 15 (150 days) and moist in all parts from about January 15 through May 1 (105 days)
Particle-size control section: 20 to 35 percent clay and 0 to 15 percent sedimentary and volcanic rock fragments
Base saturation by ammonium acetate: 100 percent

A horizon:
Hue—5YR, 10YR, or 2.5Y
Value—3, 4, or 5 dry; 2 or 3 moist
Chroma—1 or 2 dry; 1 or 2 moist
Texture of fine-earth fraction—loamy coarse sand, sandy loam, loam, sandy clay loam, silt loam, or clay
Clay content—5 to 45 percent
Rock fragment content—5 to 40 percent total, including 5 to 30 percent gravel and 0 to 20 percent cobbles
Reaction—neutral to moderately alkaline (pH 6.6 to 8.2)

B horizon:
Hue—2.5Y
Value—5, 6, or 7 dry; 2.5, 3, 4, or 5 moist
Chroma—1 dry; 1 or 2 moist
Texture of fine-earth fraction—silt loam, silty clay loam, clay loam, or clay
Clay content—25 to 40 percent

Rock fragment content—0 to 5 percent gravel
Reaction—neutral or slightly alkaline (pH 7.0 to 7.8)

Teapot Series

The Teapot series consists of very deep, well drained soils that formed in residuum derived from diatomaceous mudstone. These soils are on hills (fig. 46). Slopes range from 35 to 50 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Loamy-skeletal, mixed, superactive, acid, thermic Typic Xerorthents

Typical Pedon Description

Teapot very gravelly loam on a north-facing hillslope of 40 percent under chamise at an elevation of 1,600 feet (490 meters) (fig. 47). When described on April 13, 2005, the soil was moist throughout.

A1—0 to 3 inches (0 to 7 centimeters); grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; many very fine irregular pores; 50 percent gravel; moderately acid (pH 6.0); abrupt wavy boundary.

A2—3 to 18 inches (7 to 45 centimeters); light brownish gray (10YR 6/2) extremely gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine and common fine to coarse roots; many very fine irregular pores; 75 percent gravel; very strongly acid (pH 4.5); clear wavy boundary.

Figure 46.—Typical area of a Teapot soil.

Figure 47.—Typical profile of a Teapot soil.

C—18 to 60 inches (45 to 150 centimeters); light brownish gray (10YR 6/2) extremely gravelly loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, moderately sticky and moderately plastic; common medium and coarse roots; many very fine irregular pores; 50 percent gravel and 25 percent cobbles; very strongly acid (pH 4.5).

Typical Pedon Location

San Benito County, California; about 4,400 feet (1,350 meters) north along jeep trail from north end of Horse Valley Road and 500 feet (150 meters) northwest of the jeep trail; 575 feet east and 2,200 feet south of the northwest corner of sec. 4, T. 17 S., R. 8 E.; USGS Topo Valley, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 55.30 seconds north and longitude 121 degrees, 6 minutes, 54.90 seconds west; UTM coordinates Zone 10, 668,837 meters Easting and 4,039,063 meters Northing.

Range in Characteristics

Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Particle-size control section: 11 to 25 percent clay and 50 to 80 percent coarse fragments, mostly gravel and cobbles

A horizon:
Hue—10YR
Value—5 or 6 dry; 3 or 4 moist
Chroma—2 to 4 dry or moist
Texture of fine-earth fraction—sandy loam or loam
Clay content—7 to 25 percent
Rock fragment content—45 to 75 percent gravel
Reaction—very strongly acid to slightly acid

C horizon:
Hue—10YR
Value—5 or 6 dry; 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture of fine-earth fraction—loam or sandy loam
Clay content—18 to 25 percent
Rock fragment content—55 to 80 percent gravel
Reaction—very strongly acid or strongly acid

Toags Series

The Toags series consists of very deep, somewhat excessively drained soils that formed in alluvium derived from igneous rock. These soils are on stream terraces (fig. 48). Slopes range from 0 to 5 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Figure 48.—Typical area of a Toags soil on the stream terrace. Oxyaquic Haploxerolls are on the flood plain.

Taxonomic class: Mixed, thermic Typic Xeropsamments

Typical Pedon Description

Toags gravelly coarse sand under a canopy of buckwheat and annual grasses and forbs on a 2-percent slope at an elevation of 1,060 feet (324 meters) (fig. 49).

A1—0 to 7 inches (0 to 18 centimeters); dark grayish brown (10YR 4/2) gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine irregular pores; 20 percent gravel; slightly acid (pH 6.1); clear wavy boundary.

A2—7 to 24 inches (18 to 61 centimeters); grayish brown (10YR 5/2) gravelly coarse sand, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure and weak medium subangular blocky; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine irregular pores; 20 percent gravel; slightly acid (pH 6.3); clear wavy boundary.

C1—24 to 42 inches (61 to 107 centimeters); grayish brown (10YR 5/2) gravelly coarse sand, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; loose, nonsticky and nonplastic; common very fine roots; many very fine irregular pores; 20 percent gravel; neutral (pH 6.6); clear wavy boundary.

C2—42 to 60 (107 to 152 centimeters); light brownish gray (10YR 6/2) gravelly

Figure 49.—Typical profile of a Toags soil.

coarse sand, light yellowish brown (10YR 6/4) moist; single grain; loose, nonsticky and nonplastic; many very fine irregular pores; 10 percent gravel; neutral (pH 6.7).

Typical Pedon Location

San Benito County, California; about 230 feet (70 meters) southwest of California Highway 146 and the fire lane that leads to the South Wilderness Trail; 1,400 feet west and 2,600 feet south of the northeast corner of sec. 1, T. 17 S., R. 7 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 51.60 seconds north and longitude 121 degrees, 9 minutes, 26.90 seconds west; UTM coordinates Zone 10, 665,051 meters Easting and 4,088,870 meters Northing.

Range in Characteristics

Depth to bedrock: More than 61 inches (155 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about May 15 through November 15 (180 days) and moist in all parts from about January 15 through April 15 (90 days)
Reaction: Slightly acid to slightly alkaline throughout
Particle-size control section: 4 to 10 percent clay and 5 to 35 percent coarse fragments, mostly gravel
Base saturation by ammonium acetate: 91 to 97 percent

A horizon:
Hue—10YR
Value—4 to 6 dry; 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture of fine-earth fraction—loamy sand or coarse sand
Clay content—2 to 10 percent
Rock fragment content—5 to 35 percent gravel

C horizon:
Hue—10YR
Value—5 to 7 dry; 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture of fine-earth fraction—loamy sand, loamy coarse sand, or coarse sand
Clay content—2 to 10 percent
Rock fragment content—15 to 35 percent gravel

Tuborcio Series

The Tuborcio series consists of soils that are deep to soft bedrock and are well drained. These soils formed in residuum derived from granite. They are on backslopes of hills (fig. 50). Slopes range from 2 to 50 percent. The mean annual precipitation is about 17 inches (432 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic class: Fine, mixed, superactive, thermic Ultic Palexerolls

Typical Pedon Description

Tuborcio sandy loam on a northeast-facing hillslope of 39 percent under a cover of blue oak and annual grasses at an elevation of 2,030 feet (620 meters) (fig. 51). When described on April, 26, 2006, the soil was moist between 3 and 60 inches (8 and 153 centimeters).

Figure 50.—Typical area of a Tuborcio soil.

A1—0 to 3 inches (0 to 8 centimeters); brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 5 percent gravel; neutral (pH 6.6); clear smooth boundary.

A2—3 to 13 inches (8 to 34 centimeters); brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common fine, medium, and coarse roots; common very fine and fine tubular pores; 5 percent gravel and 1 percent cobbles; strongly acid (pH 5.2); clear smooth boundary.

Bt1—13 to 24 inches (34 to 60 centimeters); light yellowish brown (10YR 6/4) clay, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; common fine, medium, and coarse roots; common fine and medium tubular pores; few discontinuous slickensides (pedogenic) and common discontinuous faint clay films on surfaces along pores and on all faces of peds; 5 percent gravel; strongly acid (pH 5.1); gradual smooth boundary.

Bt2—24 to 33 inches (60 to 85 centimeters); brownish yellow (10YR 6/6) clay, dark yellowish brown (10YR 4/6) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; common fine and medium roots; common fine tubular pores; few discontinuous slickensides (pedogenic) and common discontinuous faint clay films on all faces of peds and on surfaces along pores; 5 percent gravel; strongly acid (pH 5.2); gradual smooth boundary.

Bt3—33 to 49 inches (85 to 125 centimeters); 50 percent very pale brown (10YR 8/3) and 50 percent very pale brown (10YR 7/4) sandy clay, 50 percent very pale brown (10YR 8/3) and 50 percent yellowish brown (10YR 5/6) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; many discontinuous distinct clay films on all faces of peds and on

Figure 51.—Typical profile of a Tuborcio soil.

surfaces along pores; 5 percent gravel; slightly acid (pH 6.1); gradual smooth boundary.

Crt—49 to 60 inches (125 to 153 centimeters); 50 percent very pale brown (10YR 8/3) and 50 percent light yellowish brown (10YR 6/4) weakly cemented granite that crushes to sandy clay loam, 50 percent very pale brown (10YR 8/3) and 50 percent yellowish brown (10YR 5/6) moist; massive; very hard, very firm, very sticky and very plastic; few clay films on gravel; 90 percent gravel; slightly acid (pH 6.3).

Typical Pedon Location

San Benito County, California; 600 feet (180 meters) northwest of the west gate to Pinnacles National Monument, on California Highway 146; 230 feet north and 756 feet west of the southeast corner of sec. 5, T. 17 S., R. 07 E.; USGS North Chalone Peak, California, topographic quadrangle; latitude 36 degrees, 28 minutes, 26.10 seconds north and longitude 121 degrees, 13 minutes, 35.80 seconds west; UTM coordinates Zone 10, 658,879 meters Easting and 4,037,979 meters Northing.

Range in Characteristics

Depth to bedrock: More than 60 inches (150 centimeters)
Mean annual soil temperature: 60 to 63 degrees F (16 to 17 degrees C)
Soil moisture control section: Dry in all parts from about June 15 through November 15 (150 days) and moist in all parts from about January 15 through May 1 (105 days)
Particle-size control section: 45 to 55 percent clay and 5 to 35 percent granite rock fragments
Base saturation by ammonium acetate: 90 to 100 percent

A horizon:
Hue—10YR
Value—4 or 5 dry; 2 or 3 moist
Chroma—2 or 3 dry; 1, 2, or 3 moist
Texture of fine-earth fraction—loam, sandy loam, coarse sandy loam, or sandy clay loam
Clay content—8 to 20 percent
Rock fragment content—5 to 20 percent gravel
Reaction—moderately acid to neutral
Base saturation by sum of cations—73 to 81 percent

Bt horizon:
Hue—10YR or 7.5YR
Value—4, 5, 6, 7, or 8 dry; 2, 3, 4, 5, or 8 moist
Chroma—2, 3, 4, or 6 dry; 2, 3, 4, or 6 moist
Texture of fine-earth fraction—clay, clay loam, or sandy clay
Clay content—20 to 55 percent
Rock fragment content—5 to 35 percent gravel
Reaction—moderately acid to neutral
Base saturation by sum of cations—75 percent

Crt horizon:
Hue—10YR
Value—6 or 8 dry; 5 or 8 moist
Chroma—2, 3, or 4 dry; 2, 3, or 6 moist
Texture of fine-earth fraction—sandy clay loam
Clay content—25 to 30 percent
Rock fragment content—80 to 90 percent paragravel
Reaction—moderately acid to neutral

Formation of the Soils

Pinnacles National Monument provides opportunities to climb the spectacular rock formations, take in the wildflower display, or spot a deer, bobcat, or condor. The soil, however, is the living organism that makes life possible at the monument. Soil is the loose mineral and organic material at the earth's surface that is capable of supporting plant growth. Soil sustains biological activity such as plant growth and microbial activity. It regulates and partitions the flow of water throughout the landscape. Soil filters, transforms, immobilizes, buffers, and degrades organic and inorganic material, including animal waste. It stores and cycles nutrients and other elements such as carbon dioxide. It supports buildings and protects archeological treasures (USDA, 1995).

The five soil-forming factors—parent material, climate, living organisms, topography, and time (Jenny, 1941)—transform rock into soil. The bare rock from a volcanic eruption has been transformed into diverse soils, many endemic to Pinnacles National Monument, supporting a wide range of plant communities. Each combination of the five factors results in a unique soil distinguished by a group of layers, or horizons, called a soil profile. Soils that have similar profiles are grouped into a series. The series may be divided into phases distinguished by features such as the texture of the surface layer, steepness of slope, or frequency of flooding. Most soil series are named after a local landmark, such as a rock formation.

Some of the soils across the panorama of soils at the monument are related by common soil-forming factors. Soils cover the topography, or landforms, from the lowest point on the flood plains of Chalone Creek to the highest point on the hillslopes of North Chalone Peak. Those that have similar parent material are most alike. The four major groups of parent material, from the lowest to the highest elevations, are alluvium (waterborne material), granite, sedimentary rock, and volcanic rock. For each of these types of parent material, differences in landform and exposure distinguish the soils that have formed. Landforms include, from the lowest to the highest elevations, flood plains, stream terraces, valley floors, and toeslopes, backslopes, and summits of hills. The extremes of exposure are the northern and southern aspects.

Oxyaquic Haploxerolls are very deep soils on nearly level and gently sloping narrow flood plains and stream terraces along Chalone Creek. The parent material is gravelly and sandy alluvium derived from rhyolite and granite. These soils are coarse textured with low water storage capacity and low fertility. In addition to rainfall, Oxyaquic Haploxerolls receive water from flooding and a high water table.

One phase of Oxyaquic Haploxerolls is on the flood plain that is frequently flooded. These soils are hydric because the seasonal flooding results in a deficiency of oxygen at the surface. The lowest stream terrace is several feet higher than the flood plain. On this stream terrace is another phase of Oxyaquic Haploxerolls that rarely floods but has a seasonal high water table within 4 feet of the surface. The upper part of these soils is well aerated most of the year, so the soils are not hydric. These two phases of Oxyaquic Haploxerolls support stands of willow, sycamore, and cottonwood. The soil profile consists of pale stratified sandy loam to very gravelly loamy coarse sand. A typical example of these Oxyaquic Haploxerolls is in an area of detailed soil map unit 132 along Chalone Creek where the South Wilderness Trail crosses it (fig. 52).

Another phase of Oxyaquic Haploxerolls is on stream terraces adjacent to hills, where seeps emerge. These soils are saturated and deficient in oxygen for most of the year. They are hydric soils and have drab color or mottles because of the absence of oxygen. They support a plant community of rushes and sedges, which tolerate the oxygen deficiency. An example of these hydric soils is in an area of detailed soil map unit 136 on the east side of Bear Valley about 1.4 miles south of California Highway 25 and in Pinnacles Campground on the east side of Bear Creek opposite the amphitheater.

The middle stream terrace is several feet higher than the lowest stream terrace. It does not flood nor does it have a seasonal high water table. The soils on it are well drained. The Elder and Still series consist of very deep soils on the nearly level to moderately sloping tread of the stream terrace in Bear Valley and along Chalone Creek. The parent material consists of alluvium derived from volcanic and sedimentary rock. Streams formerly meandered across these flood plains, leaving fresh sediment with each flood event. The resulting soil profile is stratified with dark horizontal stripes marking buried old surfaces enriched with organic matter from decomposed plants. The streams have since incised into deep channels, lowering the present water table to well below the root zone. There are no more additions of sediment on these terraces. The Elder soils are coarser in texture because they are closer to the channel where swift-moving floodwaters carried sandy sediment. The Elder soils support grassland with scattered valley oak and live oak. They are in the heart of the old Kingman Ranch, along California Highway 146 at the east entrance to the monument, where cattle have long grazed. The soil profile is dark-colored sandy loam over stratified sandy loam to gravelly loamy coarse sand to a depth of more than

Figure 52.—View of Chalone Creek, south of Frog Canyon, showing an area of detailed soil map unit 132. Riverwash is in the barren stream channel, Oxyaquic Haploxerolls gravelly loamy coarse sand is under willows on the flood plain and low stream terrace, and Toags coarse sand is under oak savannah on the high stream terrace.

60 inches. A typical example of an Elder soil is in detailed soil map unit 117. It is exposed in the vertical streambank cut, about 100 feet west of Highway 146 and about 0.7 mile south of Highway 25.

The Still soils are finer textured than are the Elder soils. They occur farther from the channel, where floodwaters moved slowly or stood still while clayey sediment slowly settled out. The soil profile is dark-colored sandy loam over stratified silty clay loam to gravelly clay loam to a depth of more than 60 inches. A typical example of a Still soil is in detailed soil map unit 128. The soil is exposed in the vertical streambank cut, about 50 feet northeast of the manager's residence at Pinnacles Campground.

The highest stream terrace has been incised by adjacent streams so that it no longer floods and groundwater is very deep below the surface. The Pinncamp and Toags soils are on this terrace. They are very deep and somewhat excessively drained. They are on nearly level to gently sloping high stream terraces along Chalone Creek and in Bear Valley and McCabe Canyon. The parent material is sandy alluvium derived from igneous and sedimentary rock. These soils are coarse grained and low in nutrients. The Pinncamp soils support stands of valley oak and live oak. The leaf fall has added organic matter to the soil and enriched the fertility of the soil (Dahlgren, 2003). Because of the high organic matter content of the surface layer, these soils effectively retain and recycle nutrients despite the high permeability rate. A typical example of a Pinncamp soil is in an area about 80 feet southwest of Highway 146 at its intersection with the fire lane that leads to the South Chalone Trail.

The Toags series consists of very deep soils on nearly level to gently sloping high stream terraces along Chalone Creek and on outwash fans at the mouth of canyons that empty into Bear Valley. These soils support stands of buckwheat. Buckwheat has not darkened the Toags soils with additions of organic matter, so the soils are lower in nutrients. The resulting soil profile is pale gravelly loamy sand more than 60 inches deep. A typical example of a Toags soil is about 230 feet southwest of Highway 146 at its intersection with the fire lane that leads to the South Chalone Trail.

The Rimtrail series developed in alluvium derived from granite. These soils are very deep and are on nearly level to gently sloping valley floors near Lopez Canyon. The parent material is coarse grained and weatherable. Storm water running into these small valleys augments rainfall, increasing the weathering of the parent material into clay and the percolation of clay from the surface layer into the subsoil. The Rimtrail soils support stands of annual grasses and forbs that have historically been grazed by livestock. The grasses have enriched the surface layer with organic matter, which stores and recycles nutrients. The resulting soil profile is a dark-colored sandy loam surface layer over a thick, bright-colored sandy clay loam subsoil that extends to a depth of more than 60 inches. A typical example of a Rimtrail soil is in an area of detailed soil map unit 112 about 600 feet west of Highway 146 on the road to Lopez Canyon (fig. 53).

Most of the monument is underlain by granite, but other parent material covers most of the granite. The granite is exposed along southern Chalone Creek and at the west entrance to the monument. The Backdoor and Tuborcio series formed in granite. This coarse grained, acidic rock weathers to deep soils that are low in nutrients. Winter rainfall percolating down through the soil transports clay from the surface layer into the subsoil. The Backdoor soils are deep and are on strongly sloping to very steep hills with both southern and northern exposures. Soil moisture is sufficient to produce enough plant growth that, when decomposed in the soil, produces a thick, dark-colored, soft surface layer. This high organic matter content effectively retains and recycles nutrients. Excess soil moisture does not leach nutrients below the root zone. The profile of the Backdoor soils consists of a dark-colored loam surface layer over a bright-colored gravelly clay loam subsoil over extremely gravelly loamy coarse sand underlying material to a depth of more than 60 inches. The soils support a plant community of mixed chaparral. Because of the depth of the soils, revegetation after

Figure 53.—View from west entrance of the monument, looking north. The soils formed in granite. The detailed soil map unit symbols and boundaries are shown in white.

fires is vigorous even though the soils are susceptible to erosion. A typical example of these soils is in an area of detailed soil map unit 148 on the brushy hills immediately north of the west entrance to the monument.

The Tuborcio soils are deep and are on gently sloping to strongly sloping hills near Lopez Canyon, adjacent to southern Chalone Creek, and surrounding Grassy Canyon. The Tuborcio soils are on northern exposures, where a low evaporation rate conserves soil moisture and maximizes weathering of the soil and leaching of nutrients. Much clay has percolated from the surface layer into the subsoil, which consists of a sandy clay with many pores plugged with clay. There is an abrupt change in texture between the surface layer and the subsoil that resists the penetration of water and roots. The subsoil of the Tuborcio soils is thicker, higher in clay content, and less permeable than that of the Backdoor soils. Roots from grasses in the understory are particularly effective in enriching the soil with organic matter. The soil profile consists of a dark-colored sandy loam surface layer over a bright-colored clay subsoil over bright-colored sandy clay loam underlying material to a depth of more than 60 inches. The soils support blue oak woodland with an understory of annual grasses. The nutrient level is low because of the parent material, but oaks are effective in recycling nutrients as the leaves of these deciduous trees decompose into the soils. A typical example of a Tuborcio soil is in an area of detailed soil map unit 122 about 600 feet northwest of the west entrance to the monument. A soil monolith of a Tuborcio soil is at the visitor's center.

Sedimentary rock includes shale, diatomaceous mudstone, sandstone, and fanglomerate. The Santa Lucia soils formed in shale. These soils are shallow and are on steep and very steep hills southwest of Highway 25 and La Gloria Road. The parent material is acidic, low in nutrients, and highly fractured. It contributes flat gravel to the soil profile. These soils have a low water storage capacity; therefore, once the soils are saturated, additional storm water runs off, eroding the soils. Because the soils store little water, solar radiation on the southern exposures dries them out early in summer. These soils support stands of drought-resistant chamise chaparral. The soil profile is channery and very channery loam 8 to 18 inches thick over fractured bedrock. A typical example of a Santa Lucia soil is about 4 miles north of Highway 146 on Highway 25, 250 feet west of Highway 25, and 1,200 feet north of the ranch house.

The Teapot soils formed in diatomaceous mudstone. These soils are very deep and are on steep and very steep hills north of Horse Valley. The parent material is an acidic, highly fractured, low density rock that is low in nutrients and contributes angular gravel to the soil profile. These soils have low water storage capacity; however, the diatomaceous mudstone can store water for use by plants. The Teapot soils erode easily when saturated and are desiccated by solar radiation early in summer. These soils support stands of chamise and scrub oak. The profile consists of a thin dark-colored very gravelly loam surface layer over extremely gravelly loam to a depth of more than 60 inches. A typical example of a Teapot soil is in an area of detailed soil map unit 123 along a jeep trail about 0.8 mile north of Horse Valley.

The Pinnacles soils formed in sandstone. These soils are moderately deep and are on moderately sloping to very steep hills and dissected terraces around Horse Valley and south of South Chalone Peak. The Pinnacles soils are on old surfaces that have been exposed to soil-forming processes for a long time. Much clay has percolated from the surface layer and formed a sandy clay subsoil with many pores plugged with clay. There is an abrupt change in texture between the surface layer and the subsoil that is resistant to the penetration of water and roots. When the soils are saturated by storm water, the surface layer can float on the subsoil and easily erode. Erosion has dissected the terraces and removed what may have been a dark-colored surface layer that was high in organic matter content. Rainfall has leached these soils so thoroughly that they are low in nutrients. The Pinnacles soils in the steeper areas support stands of chamise chaparral, but some areas have been cleared of brush to support annual grasses for grazing. A typical example of a Pinnacles soil is in an area about 0.4 mile east of Highway 146 and 1.0 mile south of the west entrance to the monument.

The Passion, Ordeal, and Longsfolly soils formed in fanglomerate. Fanglomerate is a moderately consolidated sedimentary rock composed of slightly waterworn sand-, gravel-, and cobble-sized granite rock fragments. The grain size and low nutrient level are similar to those of granite. Fanglomerate is soft, and it weathers and erodes easily. Areas of fanglomerate on steep slopes are susceptible to landslides that expose scarps. The Passion soils are shallow and are on summits of hills, and the Ordeal soils are moderately deep and are on south-facing backslopes of hills. Both of these soils are on moderately steep to very steep hills northeast of Chalone Creek. They have very low water storage capacity and quickly dry out because of the southern exposure. They support stands of drought-resistant chamise chaparral. Fertility is low because of the low amount of nutrients supplied by the parent material, the low amount of organic matter contributed by the chamise, and the losses as a result of erosion. The profile of the Passion soils is loamy sand and gravelly loamy sand 10 to 20 inches thick over soft bedrock. A typical example of a Passion soil is about 0.5 mile east of the Chalone Creek Maintenance Station. The profile of the Ordeal soils is loamy sand over gravelly and extremely gravelly loamy sand 20 to 40 inches thick over soft bedrock. A typical example of an Ordeal soil is in an area of detailed soil map unit 142 about 1.5 miles northeast of the Chalone Creek Maintenance Station. A soil monolith of an Ordeal soil is at the visitor's center (fig. 54).

The Longsfolly soils are deep and are on moderately steep to very steep hills northeast of Chalone Creek. These soils are deep to soft bedrock because the fanglomerate readily weathers and it receives sediment sliding downslope. This sediment may be the topsoil of the eroding Passion and Ordeal soils. Although

Figure 54.—View of hills northeast of Chalone Creek, showing the soils of detailed soil map unit 142, which formed in fanglomerate, a sedimentary rock. Longsfolly soils are on north aspects and support dense mixed chaparral, Ordeal soils are on south aspects and support sparse chamise chaparral, and Passion soils are on shoulder slopes and summits and support sparse chamise chaparral. Toags gravelly loamy coarse sand is on alluvial flats between hills.

Longsfolly soils have a very low water storage capacity, the moisture is conserved because the soils are on shaded northern exposures. The Longsfolly soils support lush stands of mixed chaparral. The addition of organic matter from these plants enables the soils to effectively recycle the small reservoir of nutrients. The soil profile is dark loamy sand over pale gravelly loamy sand 40 to 60 inches thick over soft bedrock. A typical example of a Longsfolly soil is in an area of detailed soil map unit 142 about 0.7 mile northeast of the Chalone Creek Maintenance Station.

Volcanic rock crowns the monument with the spectacular pinnacles of the High Peaks. The dominant volcanic parent material consists of rhyolite, rhyolitic breccia, and andesite. Rhyolite is a hard, fine grained acidic rock that is low in nutrients and resistant to weathering. The Knuckle soils and Argixerolls formed in rhyolite. The Knuckle soils are shallow and are on steep and very steep hills around the High Peaks and Chalone Peaks. These soils are resistant to soil development because of the hard rhyolite parent material and the solar radiation on the southern exposures, which dries out the soils. These soils support a meager plant community of widely spaced chamise and bushy spikemoss, which contributes little organic matter to the soils. Because of the few nutrients supplied by the parent material and the low organic matter content, these soils are low in fertility. The profile is a thin layer of pale loamy sand over very gravelly loamy sand and extremely stony loamy sand over bedrock. A typical example of a Knuckle soil is in an area of detailed soil map unit 156 south of the Chalone Peak Trail, about 1.2 miles south of Bear Gulch Reservoir.

Argixerolls are shallow or moderately deep soils on moderately steep to very steep hills around the High Peaks and Chalone Peaks. Rainfall is less effective on the Argixerolls because much of the water runs off the moderately steep to very steep slopes and the rate of evaporation and transpiration is high as a result of the hot southern exposure. Decomposing plants have contributed organic matter to the soils, which has darkened and softened the surface layer and helped to retain and recycle the few nutrients weathered from the acidic parent material. Rainfall in winter has leached clay from the surface layer and transported it down into the subsoil. The profile of the Argixerolls consists of a dark-colored gravelly sandy loam surface layer over a bright-colored very cobbly clay loam subsoil over hard bedrock. Argixerolls store only enough water to support drought-resistant chamise chaparral, but they effectively recycle the minimal nutrients. These soils shed storm water that runs into upper Bear Creek and then fills Bear Gulch Reservoir. The storm water has eroded the surface layer of some Argixerolls that have been subject to wildfire. Chamise in these areas grows in the exposed subsoil; thus, it is widely spaced and stunted. A typical example of Argixerolls is in an area of detailed soil map unit 127 upstream of Bear Gulch Reservoir, north of Bear Creek and south of Knuckle Ridge.

The pinnacles in the survey area consist of rhyolitic breccia that has resisted erosion for so long. This breccia is also resistant to soil formation. It consists of welded fragments of hard fine grained acidic rock that is low in nutrients. The Burgundy, Highpeaks, and Chalone soils formed in this material. The Burgundy soils are very shallow and are on steep and very steep rocky hills around the High Peaks and Chalone Peaks. These soils formed not so much from the weathering of the parent material but more from mineral debris washing down the face of rock ledges. Bushy spikemoss has played a key role in the formation of the Burgundy soils. This tiny plant seems to collect mineral material washing down over the rock. The roots of the spikemoss bind this material to the soil in winter and they decompose in summer, enriching the soil with organic matter. The soil profile is only 4 to 10 inches thick, and it consists of extremely gravelly sandy loam over hard bedrock. The Burgundy soils still shed much of the storm water flowing across them, but they filter out and retain much of the sediment in the water, thus delivering cleaner water to the creeks below. A typical example of a Burgundy soil is in an area of detailed soil map unit 104 about 0.5 mile west of the Chalone Creek Maintenance Station, along the High Peaks Trail (fig. 55).

The Highpeaks soils are shallow and are on steep and very steep convex hills, including the slopes of the High Peaks. These soils are mostly on northern exposures, where soil moisture is conserved because the soils are shaded and have a lower evaporation rate. The water storage capacity of these shallow soils is very low. Once the soils are saturated, most storm water runs off of the slopes. The soils remain shallow as a result of erosion by storm water and resistance of the bedrock to weathering. These soils support a lush plant community of mixed chaparral, commonly consisting of dominantly hollyleaf cherry. The soils are very dark colored and are capable of effectively storing and recycling nutrients because of the decomposition of the plants and incorporation of the organic material into the soils. The profile consists of a layer of slightly decomposed plant material over gravelly and very gravelly sandy loam 10 to 20 inches thick over weathered bedrock over hard bedrock. A typical example of a Highpeaks soil is in an area of detailed soil map unit 105 south of the Bear Gulch Trail, about 1,800 feet west of the Bench Trail.

The Chalone soils are moderately deep and are on steep and very steep hills around the High Peaks and Chalone Peaks. The Chalone soils are on northern exposures, but because of the extremely gravelly texture of the subsoil, the soils have low water storage capacity. They support only a mixed chaparral community. Apparently, fire and the subsequent erosion of the surface layer have prevented these soils from developing a thick, dark-colored surface layer. The breccia apparently has been resistant to weathering to clay, because there is minimal accumulation of clay in

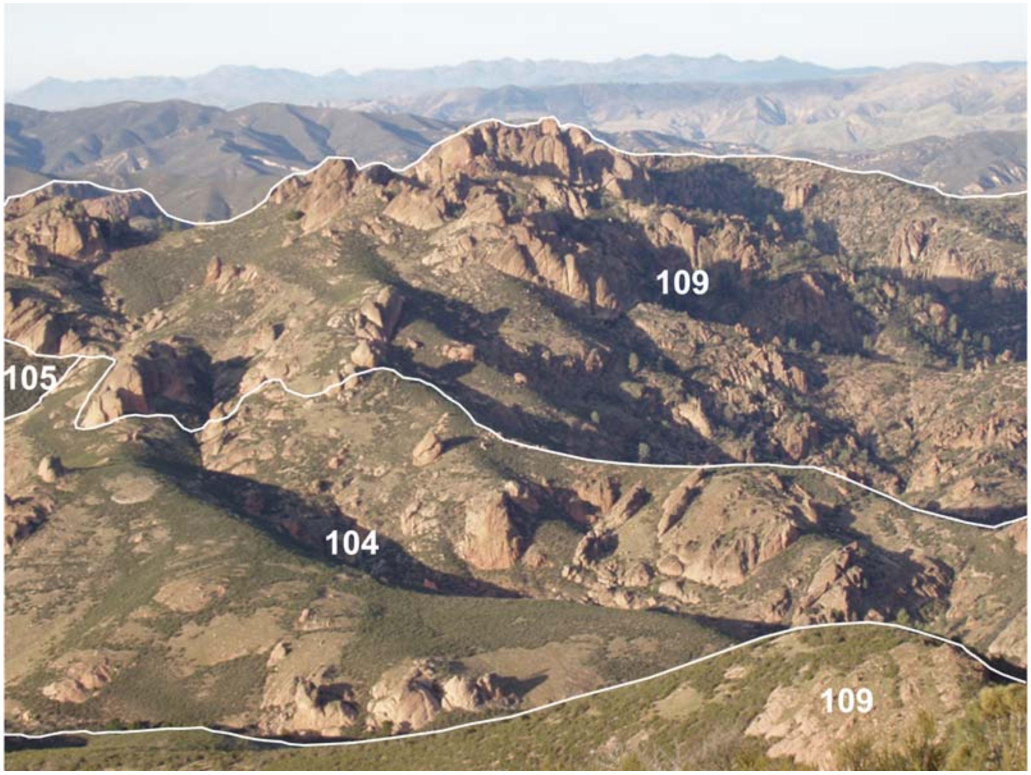


Figure 55.—View from North Chalone Peak, looking north to Bear Creek below and Harkins Peak on near horizon. The soils formed in rhyolitic breccia. The detailed soil map unit symbols and boundaries are shown in white.

the subsoil. The profile consists of a layer of slightly decomposed plant material, a thin darkened gravelly sandy loam surface layer, and a pale extremely gravelly sandy clay loam subsoil over hard bedrock. Because of the low water storage capacity of these soils, much of the storm water runs off, eroding the soils. The nutrient status of these soils is difficult to maintain because of the loss of the topsoil to erosion. The losses from these soils may accumulate and thicken soils downslope, such as the Firstsister soils. A typical example of a Chalone soil is in an area of detailed soil map unit 110 north of the High Peaks Trail, about 800 feet east of its intersection with the Condor Gulch Trail.

The Firstsister soils are very deep and are on steep and very steep footslopes of hills around the High Peaks, Mount Defiance, and the Chalone Peaks. These soils formed in colluvium derived from rhyolite. This parent material is the topsoil of the Chalone and Highpeaks soils that slid down the hillside and was deposited on the toeslope. The Firstsister soils are dark colored and enriched with organic matter throughout. They are in cool, shaded canyons where there is minimal evaporation. These soils do not have an accumulation of clay in the subsoil because the parent material is low in clay content and was deposited so recently that there hasn't been enough time for clay to percolate from the surface layer into the subsoil. The profile is uniform dark-colored loose extremely channery loam or extremely channery sandy loam more than 60 inches thick. The Firstsister soils support a plant community of live oak and buckeye with an understory of hollyleaf cherry. A typical example of a Firstsister soil is in an area of detailed soil map unit 131 immediately south of the Bear Gulch Trail, at footbridge number 5.

The Casino soils are moderately deep and are on moderately steep to very steep hills in Condor Gulch, along the eastern part of the High Peaks Trail and near North

Chalone Peak. Andesite is the parent material; it is among the highest in nutrient status at the monument. Andesite weathers to finer textured soils than does rhyolite. The Casino soils are on northern exposures where the evaporation rate is low and soil moisture is conserved. The prolonged moisture content maximizes the weathering of the parent material into soil. The grass understory is particularly effective in enriching the soils; therefore, organic matter is present deep into the soils. The profile consists of a thick, dark-colored clay loam surface layer and a dark-colored clay subsoil over hard andesite. Because of the fine texture, the Casino soils retain moisture into midsummer. They are among the most fertile and productive upland soils in the survey area. The Casino soils support blue oak woodland with an understory of annual grasses. The nutrient level is high because of the parent material, and oaks are effective in recycling nutrients as the leaves of these deciduous trees decompose into the soils. These soils shrink and crack open when dry and swell shut when moist. Negligible water runs off during the first storms in November because most of the water flows down into the cracks. Once the cracks swell shut in January or February, runoff is considerable. When the soils are moist, the surface is stable and little erosion occurs. In areas of the Casino soils that are on very steep slopes and are fully loaded with water, the surface of the bedrock can become lubricated with water and the soil can slip downslope in massive blocks. A typical example of a Casino soil is in detailed soil map unit 106 about 650 feet northwest of the public restroom along the maintenance road at the Bear Gulch Visitor's Center (fig. 56).

Fourteen of the twenty-one soil series in the monument are endemic to the area. Distinctive parent material accounts for the uniqueness of the Burgundy, Casino, Firstsister, Highpeaks, Knuckle, Longsfolly, Ordeal, Passion, and Teapot soils. The

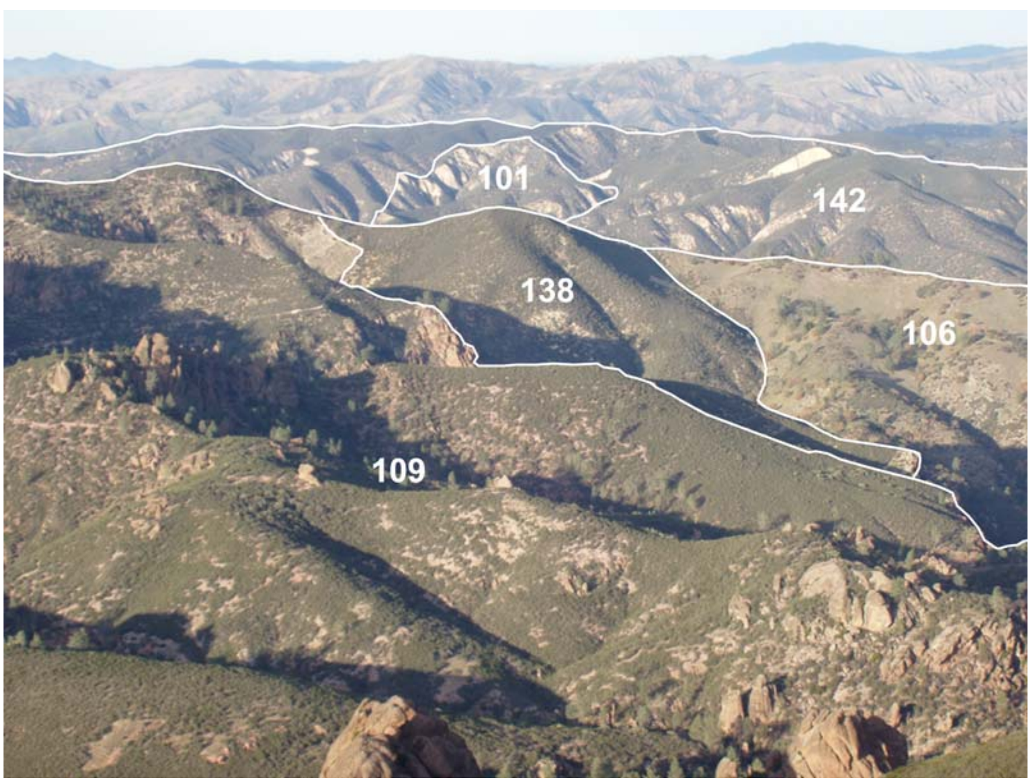


Figure 56.—View from North Chalone Peak Trail, looking northeast. The soils in the foreground formed in volcanic rock, and those in the background formed in fanglomerate. The detailed soil map unit symbols and boundaries are shown in white.

Backdoor and Tuborcio soils are distinctive because the granite parent material has been weathered to fine, soft gravel as a result of the climate. The older Tuborcio soils are more leached of nutrients than are the Backdoor soils. The Pinncamp soils are unique because leaf litter from oaks has enriched the soils with organic matter and nutrients. The buckwheat on the Toags soils has not contributed as much organic matter to the soils, but the parent material has contributed fine gravel to the soils. The designation of the survey area as a national monument is due in part to the uniqueness of the soils.

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Glossary

Andesite. A dark-colored, fine-grained extrusive rock that, where porphyritic, contains phenocrysts composed primarily of zoned sodic plagioclase (especially andesine) and one or more mafic minerals (such as biotite, hornblende, or pyroxene) with a groundmass composed of generally the same minerals as the phenocrysts, although the plagioclase may be more sodic and quartz is generally present; the extrusive equivalent of diorite. Andesite grades into latite as the content of alkali feldspar increases and into dacite as the content of alkali feldspar and quartz increases (USDI, 1996).

AASHTO classification. A system for classifying soils specifically for geotechnical engineering purposes that is related to highway and airfield construction. It is based on particle-size distribution and Atterberg limits.

AASHTO group index (GI). An empirical index number used to evaluate clayey and silty clay material.

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. A low, outspread mass of loose material and/or rock material washed down the sides of mountains and hills. It commonly has gentle slopes and is shaped like an open fan or a segment of a cone. It is deposited by a stream at the place where the stream issues from a narrow mountain valley or where a tributary stream is near or at its junction with the main stream. An alluvial fan is steepest near its apex that points upstream, and it slopes gently and convexly outward with a gradual decrease in gradient.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aridic moisture regime. Soils that have an aridic moisture regime are dry for at least one-half of the year. They commonly occur in areas that have an aridic climate. A few are in areas that have a semiarid climate, but they either have physical properties that keep them dry, such as a crusty surface that virtually precludes the infiltration of water, or have steep slopes with a high rate of runoff. Little, if any, leaching occurs in the soils in this moisture regime, and soluble salts accumulate in the soils if there is a source of salts.

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 (AWC) (available moisture capacity). The volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly estimated as the difference between the amount of water at field capacity and the amount at wilting point with adjustments for salinity, fragments, and rooting depth. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 2.5
Low	2.5 to 5.0
Moderate	5.0 to 7.5
High	7.5 to 10.0
Very high	more than 10.0

AWC. See Available water capacity.

Backslope. The hillslope profile position that forms the steepest and generally linear, middle portion of the slope. In profile, backslopes commonly are bounded by a convex shoulder above and a concave footslope below. They may or may not include cliff segments, or free faces. Backslopes are commonly erosional forms produced by mass movement, colluvial action, and running water.

Badland. A landscape that is intricately dissected and is characterized by a very fine drainage network with high drainage density and short, steep slopes with narrow interfluves. Badland develops on surfaces that have little, if any, vegetative cover, are underlain by unconsolidated or poorly cemented material (clay, silt, or sand), and in some areas have soluble minerals such as gypsum and halite.

Bar (streams). A general term for a ridgelike accumulation of sand, gravel, or other alluvial material in the channel, along the banks, or at the mouth of a stream where a decrease in velocity induces deposition. Examples are channel bars and meander bars.

Bar and channel topography. A local topography of recurring, small, sinuous or arcuate ridges separated by shallow troughs irregularly spaced across low-relief flood plains (slopes generally are 2 to 6 percent). The effect is a subdued, sinuously undulating surface that is common on active flood plains. Micro-elevational differences generally range from less than 1 meter to less than 2 meters. The elevational differences between the bars and channels are largely controlled by the competency of the stream. The ridgelike bars commonly consist of sediment that is coarser than the finer textured sediment of the low-lying areas.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Basin. Nearly level to gently sloping bottom surface of a wide structural depression between mountain ranges.

Basin floor. A general term for the nearly level, lowermost part of intermontane basins, or bolsons and semibolsons. The floor includes all of the alluvial, eolian, and erosional landforms below the piedmont slope.

Bedrock. A general term for the solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.
Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.
Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.
Breccia. A coarse-grained clastic rock composed of angular broken rock fragments held together by mineral cement or in a fine-grained matrix; differs from conglomerate in that the fragments have sharp edges and unworn corners. Breccia may originate as a result of talus accumulation, explosive igneous processes, collapse of rock material, or faulting (USDI, 1996).
Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.
Bulk density. A measurement of the oven-dry weight of the soil material that is less than 2 millimeters in diameter per unit volume. Common measurements are taken at $^1/_3$-, $^1/_{10}$-, or 15-bar moisture tension. Bulk density influences plant growth and engineering applications. It is used to convert measurements from a weight basis to a volume basis. Within a family particle-size class, bulk density is an indicator of how well plant roots are able to extend into the soil. Bulk density is used to calculate porosity.
Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.
Cambic horizon. A mineral soil horizon that has the texture of loamy very fine sand or finer, has soil structure rather than rock structure, and contains some weatherable minerals. It is characterized by the alteration or removal of mineral material as indicated by mottling or gray color, stronger chroma or redder hue than the underlying horizons, or the removal of carbonates. The cambic horizon lacks cementation or induration and has too few evidences of illuviation to meet the requirements for an argillic horizon.
Canopy. The leafy crown of trees or shrubs. (See Crown.)
Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.
Cathodic protection. Control of the electrolytic corrosion of an underground or underwater metallic structure, such as a pipeline, by the application of an electrical current in such a way that the structure acts as the cathode rather than the anode of an electrolytic cell. (See Coatings for pipelines.)
Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.
Cation-exchange capacity (CEC). The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.
CEC. See Cation-exchange capacity.
Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.
Channers. Flat rock fragments 2 to 150 millimeters long.
Chemical treatment. Control of unwanted vegetation through the use of chemicals.
Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clayey. Sandy clay, silty clay, and clay soil textures.

Claypan. A dense, compact, slowly permeable layer in the subsoil that has a much higher content of clay than the overlying material. A claypan commonly is hard when dry and plastic or sticky when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. See Rock fragments.

Coarse textured soil. Sand or loamy sand.

Coatings for pipelines. Coatings used as a barrier to the flow of electricity and moisture, thereby preventing the formation of corrosion cells.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Unconsolidated, unsorted earth material transported or deposited on side slopes and/or at the base of slopes by mass movement, or direct gravitational action, and by local unconcentrated runoff.

Compaction. The process by which the soil grains are rearranged to decrease void space and bring them into closer contact with one another, thereby increasing bulk density.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Conglomerate. A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter, commonly with a matrix of sand and finer textured material. Cementing agents include silica, calcium carbonate, and iron oxide. Conglomerate is the consolidated equivalent of gravel.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Debris flow (mass movement). The process, associated sediment (debris flow deposit), or resultant landform characterized by a very rapid type of flow dominated by sudden downslope movement of a mass of rock, soil, and mud (more than 50 percent particles that are more than 2 millimeters in size) that behaves much like viscous fluid whether it is saturated or relatively dry.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep soil. See Depth, soil.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to bedrock (in tables). Bedrock is too near the surface for the specified use.

Diatomaceous earth. A light-colored soft friable siliceous sedimentary rock consisting mainly of opaline frustules of diatoms, a unicellular aquatic plant related to algae. Some deposits are of lake origin, but most are of marine origin. Because of its high surface area, high absorptive capacity, and relative chemical stability, diatomite has a number of uses, including use as a filter aid and as an extender in paint, rubber, and plastics. The term is generally reserved for deposits that have actual or potential commercial value (USDI, 1996).

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A general term for a course or channel along which water moves in draining an area.

EC. See Electrical conductivity.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Electrical conductivity (EC). The electrolytic conductivity of an extract from saturated soil paste.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Family, soil. The most specific hierarchical category in soil taxonomy.

Fanglomerate. A sedimentary rock consisting of slightly waterworn, heterogeneous fragments of all sizes deposited in an alluvial fan and later cemented into a firm rock (USDI, 1996).

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. The nearly level plain that borders a stream and is subject to inundation under floodstage conditions unless protected artificially. It is commonly a constructional landform consisting of sediment deposited during overflow and lateral migration of a stream.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Fragments. Unattached cemented pieces of bedrock, bedrocklike material, durinodes, concretions, and nodules 2 millimeters in diameter or larger in mineral soils; woody material 20 millimeters in diameter or larger in organic soils.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Granitic. A textural term commonly pertaining to an igneous intrusive rock of felsic to intermediate composition. Referring to granitelike rock, but not necessarily true granite. Commonly applied to granite, quartz monzonite, granodiorite, and diorite.

Granite. A felsic igneous intrusive rock containing quartz and orthoclase with smaller amounts of sodic plagioclase and commonly muscovite.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hill. A generic term for an area of the land surface that rises as much as 1,000 feet (300 meters) above surrounding lowlands, commonly has restricted summit area relative to surrounding surfaces, and has a well-defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and commonly is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Hydrophobicity. The resistance of soil to wetting. It may result from the accumulation of fatty or waxy substances deposited on the soil by vegetation. These substances coat the soil grains and can penetrate deeper into the soil when volatilized by wildfire. Soils coated with hydrophobic substances resist the infiltration of water, shed more storm water as runoff, and are more vulnerable to erosion.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that does not flow year-round (commonly is dry for 3 months or more annually), and its channel generally is below the local water table. It flows only when it receives baseflow during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Intrusive. Pertaining to igneous rock derived from molten matter (magma) that invaded pre-existing rock and cooled below the surface of the earth.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation, basin. Water is applied rapidly to nearly level plains surrounded by levees or dikes to assist in production of crops.

K factor. A measurement of potential soil erodibility caused by detachment of soil particles by water.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

LEP. See Linear extensibility percent.

Linear extensibility percent (LEP). The linear expression of the volume difference between the water content of the natural soil fabric at $^{1}/_{3}$-bar or $^{1}/_{10}$-bar and oven dryness. The volume change is reported as a percent for the whole soil.

Liquid limit (LL). The moisture content at which the soil passes from a plastic to a liquid state.

LL. See Liquid limit.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam soil textures.

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.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. See Depth, soil.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface that rises more than 1,000 feet (300 meters) above surrounding lowlands, commonly has limited summit area relative to surrounding surfaces, and generally has steep sides (slopes of more than 25 percent) with or without considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic and/or volcanic activity and by differential erosion.

Muck. Unconsolidated soil material consisting primarily of highly decomposed organic material in which the original plants are not recognizable. It generally contains more mineral material and is darker in color than peat. (See Sapric soil material.)

Mudstone. An indurated mud that has the texture and composition of shale but not the fissility; a blocky or massive, fine-grained sedimentary rock in which the proportion of clay and silt is approximately equal (USDI, 1996).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

OM. See Organic matter.

Organic matter (OM). 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

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Pararock fragments. Unattached, cemented bodies or pieces of material 2 millimeters in diameter or larger that are extremely weakly cemented to moderately cemented. These fragments are not retained on sieves because samples are prepared by grinding.

Parent material. The unconsolidated and chemically weathered mineral and organic material in which the solum of a soil is formed as a result of pedogenic processes.

Peat. Unconsolidated soil material consisting largely of undecomposed or slightly decomposed organic matter that has accumulated under excessive moisture conditions. (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 (1 square meter to 10 square meters), depending on the variability of the soil.

Perched water table. The upper surface of unconfined ground water separated from an underlying main body of ground water by an unsaturated zone.

Percolation. The downward movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

PI. See Plasticity index.

Plasticity index (PI). 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.

Pleistocene. The epoch of the Quaternary period of geologic time following the Pliocene and preceding the Holocene (approximately 2 million to 10 thousand years ago). Also refers to the corresponding (time-stratigraphic) “series” of earth material.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Pyroclastic. Pertaining to fragmental material produced by commonly explosive aerial ejection of clastic particles from a volcanic vent. Such material may accumulate on land or under water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community differs from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range 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 range sites in kind, proportion, and total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rhyolite. Extrusive igneous rock, generally porphyritic and exhibiting flow texture, with phenocrysts of quartz and alkali feldspar in a glassy cryptocrystalline ground mass. The extrusive equivalent of granite.

Rill. A small steep-sided channel resulting from erosion. It is cut by a concentrated, but intermittent, flow of water, usually during and immediately following moderate rains or following icemelt or snowmelt. Generally, a rill is not an obstacle to wheeled vehicles and is shallow enough to be obliterated by ordinary tillage.

Riverwash. Barren alluvial areas of unstabilized sand, silt, clay, or gravel reworked frequently by stream activity.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bedrock, excluding lava and rock-lined pits.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

SAR. See Sodium adsorption ratio.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium. Salinity is expressed as the electrical conductivity of a saturation extract at 25 degrees C. Salinity classes, expressed in millimhos per centimeter, are as follows:

Nonsaline	0 to 2
Very slightly saline	2 to 4
Slightly saline	4 to 8
Moderately saline	8 to 16
Strongly saline	more than 16

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. A medium-grained clastic sedimentary rock composed of sand-sized fragments in a fine-grained matrix (silt or clay) and more or less firmly united by a cementing material (commonly silica, iron oxide, or calcium carbonate); the consolidated equivalent of sand. The sand particles commonly consist of quartz, and the term sandstone, when used without qualification, indicates rock that contains about 85 to 90 percent quartz. The rock varies in color, is deposited by water or wind, and contains numerous primary features (sedimentary structures and fossils) (USDI, 1996).

Sandy. Sand and loamy sand soil textures.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

SAR. See Sodium adsorption ratio.

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.

Sedimentary rock. A consolidated deposit of clastic particles, chemical precipitates, or organic matter accumulated at or near the surface of the earth under “normal” low temperature and pressure conditions. Sedimentary rock includes the consolidated equivalents of alluvial, colluvial, drift, eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. A fine-grained detrital sedimentary rock formed by the consolidation (especially by compression) of clay, silt, or mud. It is characterized by finely laminated structure, which imparts a fissility approximately parallel to the bedding, along which the rock breaks readily into thin layers, and by an appreciable content of clay minerals and detrital quartz; a thinly laminated or fissile claystone, siltstone, or mudstone. It is generally soft but sufficiently indurated so that it will not fall apart on wetting; it is less firm than argillite and slate, commonly has a splintery fracture and a smooth feel, and is easily scratched. It is red, brown, black, or gray (USDI, 1996).

Shallow soil. See Depth, soil.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Level	0 to 1 percent
Nearly level	0 to 2 percent
Moderately sloping	2 to 9 percent
Strongly sloping	9 to 20 percent
Moderately steep	20 to 35 percent
Steep	35 to 50 percent
Very steep	50 percent and higher

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

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 erodibility factors. The Kw and Kf factors quantify the susceptibility of soil to detachment by water. These erodibility factors predict the long-term average soil loss that results from sheet and rill erosion when various cropping systems and conservation techniques are used. The whole soil is considered in the Kw factor, but only the fine-earth fraction, which is the material less than 2 millimeters in diameter, is considered in the Kf factor.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A sheetlike lag concentration of coarse fragments in surficial sediment. In cross section, the line may be marked only by scattered fragments or it may be a discrete layer of fragments. The fragments are more commonly pebbles or cobbles than stones. A stone line generally overlies material that was subject to weathering, soil formation, and erosion before deposition of the overlying material. Many stone lines appear to be buried erosion pavement originally formed by running water on the land surface and concurrently covered by surficial sediment.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Referring to geologic deposits that were formed, arranged, or laid down in layers. Layers in soils that are a result of the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stream terrace. One of a series of platforms in a stream valley that flanks and is more or less parallel to the stream channel, originally formed near the level of the stream, and represents the dissected remnants of an abandoned flood plain, streambed, or valley floor produced during an earlier period of erosion or deposition.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsidence. The decrease in surface elevation as a result of the drainage of wet soils that have organic layers or semifluid mineral layers.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

T factor. The soil loss tolerance, which is defined as the maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained. Maintaining the quality of the soil includes maintaining the surface soil as a seedbed for plants, maintaining the atmosphere-soil interface to allow the entry of air and water into the soil and still protect the underlying soil from wind and water erosion, and maintaining the total soil volume as a reservoir for water and plant nutrients, which is preserved by minimizing soil loss.

Talf. A geomorphic component of flat plains, such as lake plains, low coastal plains, and low-gradient till plains, consisting of an essentially flat (0 to 1 percent slopes) and broad area dominated by closed depressions and a nonintegrated or poorly integrated drainage system. Precipitation tends to pond locally, and lateral transport is slow both above and below ground, which results in accumulation of soil organic matter and retention of fine-earth sediment. Better drained soils commonly are adjacent to drainageways.

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.

Temperature regime, soil. A system that categorizes for taxonomic purposes general, long-term soil temperature conditions at the standard depth of 20 inches or at the surface of the bedrock, whichever is at a shallower depth. The various regimes are defined according to the freezing point of water or to the high and low extremes for significant biological activity. The regimes, which are defined in "Keys to Soil Taxonomy," are as follows:

Pergellic.—Soils that have a mean annual temperature of less than 32 degrees F and have permafrost.

Cryic.—Soils that have a mean annual temperature of 32 to 47 degrees F and remain cold in summer.

Frigid.—Soils that have a mean annual temperature similar to that of the cryic regime but have a mean summer temperature at least 9 degrees warmer.

Mesic.—Soils that have a mean annual temperature of 47 to 59 degrees F, and the difference between the mean summer and mean winter temperature is more than 9 degrees.

Thermic.—Soils that have a mean annual temperature of 59 to 72 degrees F, and the difference between the mean summer and mean winter temperature is more than 9 degrees.

Hyperthermic.—Soils that have a mean annual temperature of more than 72 degrees F, and the difference between the mean summer and mean winter temperature is more than 9 degrees.

Terrace (geomorphologic). A steplike surface bordering a valley floor or shoreline that represents the former position of a flood plain, lake, or seashore. The term is commonly applied to both the relatively flat summit surface (tread) that has been cut or builtup by stream or wave action and the steeper descending slope (scarp or riser) that grades to a lower base level of erosion. Practically, terraces are considered to be generally flat alluvial areas above the 100-year flood stage.

Terracette. A small, irregular steplike area on steep hillslopes, especially in pasture, that formed as a result of creep or erosion of surficial material that may or may not have been induced by trampling of livestock such as sheep or cattle.

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." The abbreviations (see table 8b) are *c—clay, cl—clay loam, cos—coarse sand, cosl—coarse sandy loam, fs—fine sand, fsl—fine sandy loam, l—loam, lcos—loamy coarse sand, lfs—loamy fine sand, ls—loamy sand, lvfs—loamy very fine sand, s—sand, sc—sandy clay, scl—sandy clay loam, si—silt, sic—silty clay, sicl—silty clay loam, sil—silt loam, sl—sandy loam, vfs—very fine sand,* and *vfsl—very fine sandy loam.*

Thermic temperature regime. See Temperature regime, soil.

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 land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A generic term for any consolidated or cemented deposit that is 50 percent volcanic ash (less than 2 millimeters in size). Various types of tuff can be recognized by their composition; acidic tuff is dominantly acidic particles and basic tuff is dominantly basic particles.

Unified soil classification. A system for classifying mineral and organic soils for engineering purposes based on particle-size characteristics, liquid limit, and plasticity index.

Upland (geomorphologic). A general term for the higher land of a region in contrast to the low-lying, adjacent land, such as a valley or plain; land at a higher elevation than the flood plain or low stream terrace; or land above the footslope zone of the hillslope continuum.

Vegetative cover. The crown cover of all live plants in relation to the ground surface.

Very deep soil. See Depth, soil.

Very shallow soil. See Depth, soil.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water table. The upper surface of ground water or the level below which the soil is saturated by water. Also, the top of an aquifer.

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.

WEG. See Wind erodibility group.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Wind erodibility group (WEG). A grouping of soils that have similar properties affecting their resistance to wind erosion in cultivated areas.

Windthrow. The uprooting and tipping over of trees by the wind.

Xeric moisture regime. The typical moisture regime in areas of Mediterranean climates, where it is moist and cool in winter and warm and dry in summer. When potential evapotranspiration is at a minimum, the moisture, which falls in winter, is particularly effective in leaching. The mean annual soil temperature is less than

22 degrees C, and the difference between the mean summer and mean winter soil temperature is 6 degrees.

Xerophytic. Pertaining to vegetation that is adapted to dry areas.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1971-2000 at Pinnacles National Monument, California)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	*°F*	*°F*	*°F*	*°F*	*Units*	*In*	*In*	*In*		*In*
January-----	61.6	32.8	47.2	79	20	229	3.20	0.74	5.43	5	0.2
February----	63.8	35.4	49.6	82	20	272	3.16	0.77	5.13	5	0.0
March-------	65.5	37.5	51.5	84	26	349	3.47	1.05	5.88	6	0.0
April-------	71.4	39.1	55.2	93	28	453	1.12	0.26	1.79	3	0.0
May---------	79.1	43.0	61.0	100	31	648	0.50	0.00	0.72	1	0.0
June--------	87.5	46.8	67.2	105	33	814	0.08	0.00	0.12	0	0.0
July--------	94.1	50.5	72.3	109	39	1,002	0.04	0.00	0.03	0	0.0
August------	94.2	50.2	72.2	109	39	994	0.10	0.00	0.04	0	0.0
September---	89.8	48.2	69.0	107	37	862	0.34	0.00	0.42	0	0.0
October-----	81.0	42.2	61.6	102	30	667	0.93	0.08	1.83	1	0.0
November----	68.8	36.2	52.5	89	22	373	1.72	0.22	3.03	3	0.0
December----	62.1	32.1	47.1	78	18	231	2.45	0.62	4.40	4	0.1
Yearly:											
Average---	76.6	41.2	58.9	---	---	---	---	---	---	---	---
Extreme---	116	10	---	112	17	---	---	---	---	---	---
Total-----	---	---	---	---	---	6,894	17.09	11.09	21.02	28	0.3

Average number of days per year with at least 1 inch of snow on the ground: 0

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold: 40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-1990 at Pinnacles National Monument, California)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 18	May 2	May 23
2 years in 10 later than--	March 3	April 15	May 13
5 years in 10 later than--	February 2	March 14	April 25
First freezing temperature in fall:			
1 year in 10 earlier than--	November 21	November 9	October 13
2 years in 10 earlier than--	November 29	November 14	October 20
5 years in 10 earlier than--	December 13	November 25	November 3

Table 3.--Growing Season

(Recorded in the period 1971-2000 at Pinnacles National Monument, California)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	*Days*	*Days*
9 years in 10	257	201	155
8 years in 10	284	220	168
5 years in 10	>365	254	194
2 years in 10	>365	289	219
1 year in 10	>365	307	232

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

Map symbol*	Soil name	Acres	Percent
101	Ordeal-Passion-Badlands association, 50 to 100 percent slopes	3,171	11.7
104	Knuckle-Burgundy-Argixerolls complex, 20 to 70 percent slopes	1,573	5.8
105	Chalone-Firstsister-Highpeaks complex, 50 to 70 percent slopes	1,207	4.5
106	Casino-Argixerolls complex, 50 to 70 percent slopes	436	1.6
107	Casino sandy clay loam, 20 to 35 percent slopes	114	0.4
109	Rock outcrop-Highpeaks-Burgundy complex, 35 to 100 percent slopes	1,498	5.5
110	Knuckle-Chalone-Burgundy complex, 35 to 70 percent slopes	149	0.5
111	Backdoor-Tuborcio complex, 20 to 70 percent slopes	3,768	13.9
112	Rimtrail sandy loam, 0 to 5 percent slopes	60	0.2
113	Elder-Oxyaquic Haploxerolls complex, 2 to 5 percent slopes	32	0.1
114	Ordeal-Tuborcio-Passion complex, 20 to 50 percent slopes	2,094	7.7
115	Tuborcio loam, 2 to 20 percent slopes	185	0.7
117	Elder gravelly sandy loam, 0 to 1 percent slopes	154	0.6
119	Still clay, 0 to 2 percent slopes	46	0.2
120	Elder coarse sandy loam, 1 to 3 percent slopes	69	0.3
122	Tuborcio sandy loam, 35 to 50 percent slopes	790	2.9
123	Teapot-Rock outcrop complex, 35 to 50 percent slopes	191	0.7
127	Argixerolls-Rock outcrop-Chalone complex, 35 to 50 percent slopes	623	2.3
128	Still-Riverwash complex, 0 to 2 percent slopes	98	0.4
131	Firstsister-Oxyaquic Haploxerolls-Rock outcrop complex, 0 to 50 percent slopes	21	0.1
132	Toags-Oxyaquic Haploxerolls-Riverwash complex, 0 to 2 percent slopes	254	0.9
133	Toags-Pinncamp complex, 0 to 5 percent slopes	80	0.3
134	Toags gravelly coarse sand, 2 to 9 percent slopes	59	0.2
135	Toags-Riverwash complex, 0 to 9 percent slopes	109	0.4
136	Oxyaquic Haploxerolls, 0 to 1 percent slopes	20	0.1
138	Rock outcrop-Highpeaks-Chalone complex, 35 to 50 percent slopes	730	2.7
139	Highpeaks-Rock outcrop complex, 35 to 50 percent slopes	282	1.0
142	Ordeal-Longsfolly-Passion complex, 9 to 50 percent slopes	3,803	14.0
146	Badlands	59	0.2
148	Backdoor-Tuborcio complex, 35 to 50 percent slopes	2,143	7.9
152	Backdoor sandy loam, 9 to 20 percent slopes	163	0.6
155	Chalone-Knuckle-Rock outcrop complex, 35 to 50 percent slopes	651	2.4
156	Chalone-Knuckle-Firstsister complex, 50 to 70 percent slopes	1,716	6.3
PgE	Pinnacles coarse sandy loam, 5 to 30 percent slopes	175	0.6
PhG2	Pinnacles stony sandy loam, 30 to 75 percent slopes	29	0.1
PnE2	Pinnacles coarse sandy loam, 15 to 30 percent slopes	164	0.6
PnG3	Pinnacles coarse sandy loam, 30 to 75 percent slopes	240	0.9
SdG3	Santa Lucia channery loam, 30 to 75 percent slopes	139	0.5
	Total	27,095	100.0

*The numeric map unit symbols used in this publication are new. Alphabetic map unit symbols were used in older surveys that included part of this area.

Table 5.--Mean Annual Precipitation, Landscape, Parent Material, and Ecological Site

Map symbol and soil name	Percent of map unit	Slope	Elevation	Mean annual precipi-tation	Landscape position	Landform	Parent material	Ecological site
		Pct	*Ft*	*In*				
101:								
Ordeal	50	50-75	980-2,300	17-19	Hills	Hills	Residuum derived from fanglomerate	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Passion	30	50-75	980-2,300	17-19	Hills	Hills	Residuum derived from fanglomerate	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Badlands	10	75-100	980-2,300	17-19	Hills	Scarps, hills	Residuum derived from fanglomerate	---
104:								
Knuckle	35	50-70	980-2,490	17-19	Hills	Hills	Residuum derived from rhyolite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Burgundy	25	50-75	980-2,490	17-19	Hills	Hills	Residuum derived from rhyolite	Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
Argixerolls	15	20-35	980-2,490	17-19	Hills	Hills	Residuum derived from rhyolite and/or andesite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
105:								
Chalone	35	50-70	980-3,360	17-19	Hills	Backslopes of hills	Residuum derived from rhyolite	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Firstsister	35	50-70	980-3,360	17-19	Hills	Colluvial footslopes of hills	Colluvium derived from rhyolite	Footslopes & Backslopes 17-19" P.z. (R015XI105CA)
Highpeaks	20	50-70	980-3,360	17-19	Hills	Convex backslopes of hills	Residuum derived from andesite	Footslopes & Backslopes 17-19" P.z. (R015XI105CA)
106:								
Casino	50	50-70	980-3,280	17-19	Hills	Hills	Residuum derived from acidic tuff and/or andesite	Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Argixerolls	30	50-70	980-3,280	17-19	Hills	Hills	Residuum derived from rhyolite, andesite, and/or dacite	Steep, Clayey-Skeletal, South-Facing Slopes 17-19" P.z. (R015XI104CA)
107:								
Casino	70	20-35	980-3,280	17-19	Hills	Backslopes of hills	Residuum derived from acidic tuff and/or andesite	Quercus Douglasii/Nassella Pulchra (F015XI200CA)

Table 5.--Mean Annual Precipitation, Landscape, Parent Material, and Ecological Site--Continued

Map symbol and soil name	Percent of map unit	Slope	Elevation	Mean annual precipi- tation	Landscape position	Landform	Parent material	Ecological site
		Pct	*Ft*	*In*				
109:								
Rock outcrop, pinnacles of rhyolitic breccia-	35	50-100	980-3,360	17-19	Hills	Hills	Residuum derived from rhyolite	---
Highpeaks----------	35	35-50	980-3,360	17-19	Hills	Backslopes of hills	Residuum derived from rhyolite	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Burgundy-----------	20	35-50	980-3,360	17-19	Hills	Hills	Residuum derived from rhyolite	Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
110:								
Knuckle------------	35	50-70	980-2,710	17-19	Hills	Hills	Residuum derived from rhyolite	Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
Chalone------------	30	35-70	980-2,710	17-19	Hills	Backslopes of hills	Residuum derived from rhyolite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Burgundy-----------	20	35-50	980-2,710	17-19	Hills	Hills	Residuum derived from rhyolite	Exposed, Rocky Slopes 17-19" P.z. (R015XI110CA)
111:								
Backdoor sandy loam	35	50-70	950-2,790	17-19	Hills	Backslopes of hills	Residuum derived from granite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Backdoor gravelly sandy loam--------	30	50-70	950-2,790	17-19	Hills	Backslopes of hills	Residuum derived from granite	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Tuborcio-----------	20	20-50	950-2,790	17-19	Hills	Hills	Residuum derived from granite	Quercus Douglasii/Nassella Pulchra (F015XI200CA)
112:								
Rimtrail-----------	85	0-5	490-1,640	17-19	River valleys	Valley flats	Alluvium derived from granite	Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
113:								
Elder--------------	40	2-5	1,310-1,640	17-19	River valleys	Stream terraces valleys	Alluvium derived from granite	Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
Oxyaquic Haploxerolls, rarely flooded----	40	2-5	1,310-1,640	17-19	River valleys	Stream terraces	Alluvium derived from rhyolite and/or granite	Riparian Areas 17-19" P.z. (R015XI103CA)

Table 5.--Mean Annual Precipitation, Landscape, Parent Material, and Ecological Site--Continued

Map symbol and soil name	Percent of map unit	Slope	Elevation	Mean annual precipi-tation	Landscape position	Landform	Parent material	Ecological site
		Pct	Ft	In				
114:								
Ordeal	40	20-50	950-2,410	17-19	Hills	Shoulder slopes of hills	Residuum derived from sandstone	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Tuborcio	35	20-50	950-2,410	17-19	Hills	Hills	Residuum derived from granite	Quercus Douglasii/Nassella Pulchra (F015XI200CA)
Passion	15	20-50	950-2,410	17-19	Hills	Hills	Residuum derived from sandstone	Hills, South-Facing 17-19" P.z. (R015XI100CA)
115:								
Tuborcio	80	2-20	950-2,410	17-19	Hills	Hills	Residuum derived from granite	Quercus Douglasii/Nassella Pulchra (F015XI200CA)
117:								
Elder	80	0-1	1,000-1,200	17-19	River valleys	Flood plains	Alluvium derived from conglomerate	Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
119:								
Still	80	0-2	900-1,310	17-19	River valleys	Concave stream terraces	Alluvium derived from volcanic and sedimentary rock	Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
120:								
Elder	80	1-3	1,000-1,200	17-19	River valleys	Alluvial fans	Alluvium derived from conglomerate	Clayey, Valley Flats 17-19" P.z. (R015XI108CA)
122:								
Tuborcio	80	35-50	950-2,410	17-19	Hills	Hills	Residuum derived from granite	Quercus Douglasii/Nassella Pulchra (F015XI200CA)
123:								
Teapot	60	35-50	980-2,300	17-19	Hills	Side slopes of hills	Residuum derived from mudstone	Diatomaceous Hillslopes 17-19" P.z. (R015XI106CA)
Rock outcrop, diatomaceous mudstone	30	35-50	980-2,300	17-19	Hills	Hills	Residuum derived from mudstone	---
127:								
Argixerolls	50	35-50	980-2,820	17-19	Hills	Hills	Residuum derived from rhyolite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Rock outcrop, rhyolite	20	35-50	980-2,820	17-19	Hills	Hills	Residuum derived from rhyolite	---

Table 5.--Mean Annual Precipitation, Landscape, Parent Material, and Ecological Site--Continued

Map symbol and soil name	Percent of map unit	Slope	Elevation	Mean annual precipi- tation	Landscape position	Landform	Parent material	Ecological site
		Pct	*Ft*	*In*				
127:								
Chalone	15	35-50	980-2,820	17-19	Hills	Backslopes of hills	Residuum derived from rhyolite	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
128:								
Still	70	0-2	900-1,310	17-19	River valleys	Stream terraces	Alluvium derived from volcanic and sedimentary rock	Riparian Areas 17-19" P.z. (R015XI103CA)
Riverwash	20	0-2	900-1,310	17-19	River valleys	Channels	Alluvium derived from volcanic and sedimentary rock	Riparian Areas 17-19" P.z. (R015XI103CA)
131:								
Firstsister	50	35-50	980-2,460	17-19	Hills	Colluvial foot slopes of hills	Colluvium derived from rhyolite	Riparian Areas 17-19" P.z. (R015XI103CA)
Oxyaquic Haploxerolls, frequently flooded	15	0-5	980-2,460	17-19	River valleys	Lower stream terraces	Alluvium derived from rhyolite	Riparian Areas 17-19" P.z. (R015XI103CA)
Rock outcrop, rhyolite or breccia	15	35-50	980-2,460	17-19	Hills	Hills	Residuum derived from rhyolite	---
132:								
Toags	50	0-2	660-1,640	17-19	River valleys	Bars, flood plains	Alluvium derived from volcanic and sedimentary rock	Upper Stream Terraces 17-19" P.z. (R015XI107CA)
Oxyaquic Haploxerolls, rarely flooded	20	0-2	660-1,640	17-19	River valleys	Higher stream terrace	Alluvium derived from granite and/or rhyolite	Riparian Areas 17-19" P.z. (R015XI103CA)
Riverwash	15	0-2	660-1,640	17-19	River valleys	Channels	Alluvium derived from volcanic and sedimentary rock	Riparian Areas 17-19" P.z. (R015XI103CA)
133:								
Toags	50	0-5	980-1,640	17-19	River valleys	High stream terraces	Alluvium derived from fanglomerate	Upper Stream Terraces 17-19" P.z. (R015XI107CA)
Pinncamp	30	0-5	980-1,640	17-19	River valleys	High stream terraces	Alluvium derived from conglomerate	Quercus Lobata-Quercus Wislizeni/Carex Barbarae (F015XI201CA)

Table 5.--Mean Annual Precipitation, Landscape, Parent Material, and Ecological Site--Continued

Map symbol and soil name	Percent of map unit	Slope	Elevation	Mean annual precipi-tation	Landscape position	Landform	Parent material	Ecological site
		Pct	*Ft*	*In*				
134:								
Toags--------------	70	2-9	980-1,640	17-19	River valleys	Outwash fans	Alluvium derived from fanglomerate	Upper Stream Terraces 17-19" P.z. (R015XI107CA)
135:								
Toags--------------	50	2-9	980-1,640	17-19	River valleys	Bars	Alluvium derived from conglomerate	Upper Stream Terraces 17-19" P.z. (R015XI107CA)
Riverwash----------	35	0-2	980-1,640	17-19	River valleys	Channels	Alluvium derived from volcanic and sedimentary rock	Riparian Areas 17-19" P.z. (R015XI103CA)
136:								
Oxyaquic Haploxerolls, ponded------------	90	0-1	980-1,310	17-19	River valleys	Stream terraces	Alluvium derived from granite and/or rhyolite	Riparian Areas 17-19" P.z. (R015XI103CA)
138:								
Rock outcrop, rhyolite or breccia-----------	40	35-50	980-3,360	17-19	Hills	Hills	Residuum derived from rhyolite	---
Highpeaks----------	30	35-50	980-3,360	17-19	Hills	Convex backslopes of hills	Residuum derived from acidic volcanic breccia	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Chalone------------	15	35-50	980-3,360	17-19	Hills	Backslopes of hills	Residuum derived from acidic volcanic breccia	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
139:								
Highpeaks----------	75	35-50	980-3,360	17-19	Hills	Convex backslopes of hills	Residuum derived from rhyolite	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Rock outcrop, rhyolitic breccia	15	35-50	980-3,360	17-19	Hills	Hills	Residuum derived from rhyolite	---
142:								
Ordeal-------------	40	35-50	950-2,410	17-19	Hills	Backslopes of hills	Residuum derived from fanglomerate	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Longsfolly---------	35	35-50	950-2,410	17-19	Hills	Hills	Residuum derived from fanglomerate	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Passion------------	15	9-35	950-2,410	17-19	Hills	Hills	Residuum derived from fanglomerate	Hills, South-Facing 17-19" P.z. (R015XI100CA)

Table 5.--Mean Annual Precipitation, Landscape, Parent Material, and Ecological Site--Continued

Map symbol and soil name	Percent of map unit	Slope	Elevation	Mean annual precipi- tation	Landscape position	Landform	Parent material	Ecological site
		Pct	*Ft*	*In*				
146:								
Badlands, scarps in conglomerate------	90	70-200	980-2,300	17-19	Hills	Scarps, hills	Residuum derived from fanglomerate	---
148:								
Backdoor-----------	55	35-50	950-2,790	17-19	Hills	Backslopes of hills	Residuum derived from granite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Tuborcio-----------	30	35-50	950-2,790	17-19	Hills	Hills	Residuum derived from granite	Quercus Douglasii/Nassella Pulchra (F015XI200CA)
152:								
Backdoor-----------	85	9-20	980-2,790	17-19	Hills	Hills	Residuum derived from granite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
155:								
Chalone------------	40	35-50	980-2,710	17-19	Hills	Backslopes of hills	Residuum derived from rhyolite	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Knuckle------------	35	35-50	980-2,710	17-19	Hills	Hills	Residuum derived from rhyolite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Rock outcrop, rhyolite----------	15	35-50	980-2,710	17-19	Hills	Hills	Residuum derived from rhyolite	---
156:								
Chalone------------	45	50-70	980-2,710	17-19	Hills	Backslopes of hills	Residuum derived from rhyolite	Upper, North-Facing Slopes 17-19" P.z. (R015XI101CA)
Knuckle------------	25	50-70	980-2,710	17-19	Hills	Hills	Residuum derived from rhyolite	Hills, South-Facing 17-19" P.z. (R015XI100CA)
Firstsister--------	15	50-70	980-2,710	17-19	Hills	Colluvial footslopes of hills	Colluvium derived from rhyolite	Footslopes & Backslopes 17-19" P.z. (R015XI105CA)
PgE:								
Pinnacles----------	85	5-30	1,000-3,000	10-17	Hills	Dissected terraces	Consolidated gravelly coarse-loamy alluvium derived from igneous rock	Hills, South-Facing 17-19" P.z. (R015XI100CA)

Table 5.--Mean Annual Precipitation, Landscape, Parent Material, and Ecological Site--Continued

Map symbol and soil name	Percent of map unit	Slope	Elevation	Mean annual precipi- tation	Landscape position	Landform	Parent material	Ecological site
		Pct	*Ft*	*In*				
PhG2:								
Pinnacles----------	50	30-75	1,000-3,000	10-16	Hills	Escarpments, terraces	Consolidated gravelly coarse-loamy alluvium derived from igneous rock	Hills, South-Facing 17-19" P.z. (R015XI100CA)
PnE2:								
Pinnacles----------	85	15-30	1,000-3,000	14-18	Hills	Hills	Residuum derived from sandstone	Hills, South-Facing 17-19" P.z. (R015XI100CA)
PnG3:								
Pinnacles----------	85	30-75	1,000-3,000	14-18	Hills	Hills	Residuum derived from sandstone	Hills, South-Facing 17-19" P.z. (R015XI100CA)
SdG3:								
Santa Lucia--------	85	30-75	1,200-2,000	12-19	Hills	Hills	Residuum derived from shale	Hills, South-Facing 17-19" P.z. (R015XI100CA)

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
101:						
Ordeal	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Rattail fescue (VUMY)	20
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
Passion	Hills, South-Facing 17-19" P.z. R015XI100CA	1,000	800	600	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Rattail fescue (VUMY)	20
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
Badlands	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
104:						
Knuckle	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	59
					Bushy spikemoss (SEBI)	32
					Black sage (SAME3)	6
					California buckwheat (ERFA2)	5
					Wild oat (AVFA)	5
					Sandberg bluegrass (POSE)	2
					Rattail fescue (VUMY)	2
					Buckbrush (CECU)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
Burgundy	Exposed, Rocky Slopes 17-19" P.z. R015XI110CA	225	150	75	Chamise (ADFA)	30
					Bushy spikemoss (SEBI)	32
					California buckwheat (ERFA2)	7
					Wild oat (AVFA)	4
					Rattail fescue (VUMY)	1
Argixerolls	Hills, South-Facing 17-19" P.z. R015XI100CA	1,000	800	600	Chamise (ADFA)	59
					Buckbrush (CECU)	1
					Bushy spikemoss (SEBI)	32
					Black sage (SAME3)	6
					California buckwheat (ERFA2)	5
					Wild oat (AVFA)	5
					Sandberg bluegrass (POSE)	2
					Rattail fescue (VUMY)	2
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
105:						
Chalone	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,400	1,200	1,000	Chamise (ADFA)	36
					Buckbrush (CECU)	17
					Bigberry manzanita (ARGL4)	15
					Hollyleaf cherry (PRIL)	11
					Scrub oak (QUBE5)	10
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	25
					Silver hairgrass (AICA)	21
					Sandberg bluegrass (POSE)	15
					Soft brome (BRHO2)	7
					Orange bush monkeyflower (DIAU)	8
					California maidenhair (ADJO)	5
					Birchleaf mountain mahogany (CEMOG)	5
					Blue oak (QUDO)	5
					Interior live oak (QUWI2)	5
					Smooth catsear (HYGL2)	5
					Toyon (HEAR5)	4
					California ash (FRDI2)	3
					Foothill pine (PISA2)	3
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Ripgut brome (BRDI3)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	Lb/acre	Lb/acre		Pct
105:						
Firstsister	Footslopes & Backslopes 17-19" P.z. R015XI105CA	2,000	1,750	1,500	Hollyleaf cherry (PRIL)	45
					California buckeye (AECA)	18
					Buckbrush (CECU)	18
					Scrub oak (QUBE5)	14
					Pacific poison oak (TODI)	15
					Ripgut brome (BRDI3)	13
					Sandberg bluegrass (POSE)	12
					Fringed redmaids (CACI2)	11
					Rattail fescue (VUMY)	10
					Silver hairgrass (AICA)	10
					California maidenhair (ADJO)	9
					California sycamore (PLRA)	45
					Blue oak (QUDO)	42
					California live oak (QUAG)	25
					California juniper (JUCA7)	8
					Pipestem clematis (CLLA3)	8
					Wild oat (AVFA)	7
					Goldback fern (PETR7)	5
					Toyon (HEAR5)	5
					Minerslettuce (CLPE)	4
					Nested polypody (POCA26)	4
					Chamise (ADFA)	3
					Creeping snowberry (SYMO)	3
					California ash (FRDI2)	1
					Birchleaf mountain mahogany (CEMOG)	1
					Chaparral dodder (CUCA)	1
					Crinkled onion (ALCR5)	1
					Foothill pine (PISA2)	1
					Orange bush monkeyflower (DIAU)	1
					Soft brome (BRHO2)	1
					Zigzag larkspur (DEPA3)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
105:						
Highpeaks	Footslopes & Backslopes 17-19" P.z. R015XI105CA	1,800	1,500	1,200	Hollyleaf cherry (PRIL)	37
					Buckbrush (CECU)	18
					Rattail fescue (VUMY)	18
					Ripgut brome (BRDI3)	13
					Sandberg bluegrass (POSE)	12
					Silver hairgrass (AICA)	10
					California maidenhair (ADJO)	9
					Wild oat (AVFA)	7
					Chamise (ADFA)	3
					Birchleaf mountain mahogany (CEMOG)	1
					Chaparral dodder (CUCA)	1
					Orange bush monkeyflower (DIAU)	1
					Soft brome (BRHO2)	1
					Toyon (HEAR5)	1
106:						
Casino	Quercus Douglasii/Nassella Pulchra F015XI200CA	3,000	2,500	2,000	Birchleaf mountain mahogany (CEMOG)	3
					Creeping snowberry (SYMO)	2
					Ripgut brome (BRDI3)	40
					Wild oat (AVFA)	20
					Sandberg bluegrass (POSE)	15
					Melic (MELIC)	15
					Rattail fescue (VUMY)	11
					California bedstraw (GACA3)	10
					Blue oak (QUDO)	60
					Foothill pine (PISA2)	12
					Chilean bird's-foot trefoil (LOWR2)	10
					Soft brome (BRHO2)	6
					Silver hairgrass (AICA)	4
					California brome (BRCA5)	3
					Nodding needlegrass (NACE)	3
					Chaparral clarkia (CLAF)	2
					Spanish brome (BRMA3)	1
					Wild onion (ALLIU)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
106:						
Argixerolls	Steep, Clayey-Skeletal, South-Facing Slopes 17-19" P.z. R015XI104CA	1,200	1,000	800	California sagebrush (ARCA11)	15
					Chamise (ADFA)	15
					Maltese star-thistle (CEME2)	28
					Tussockgrass (NASSE)	18
					Rattail fescue (VUMY)	8
					Texas Indian paintbrush (CAFO2)	5
					California buckwheat (ERFA2)	3
					Black sage (SAME3)	2
					Crinkled onion (ALCR5)	8
					Common deerweed (LOSC2)	3
					Wild oat (AVFA)	3
					Coast Indian paintbrush (CAAF)	2
					Larkspur (DELPH)	2
107:						
Casino	Quercus Douglasii/Nassella Pulchra F015XI200CA	3,000	2,500	2,000	Birchleaf mountain mahogany (CEMOG)	3
					Creeping snowberry (SYMO)	2
					Ripgut brome (BRDI3)	40
					Wild oat (AVFA)	20
					Sandberg bluegrass (POSE)	15
					Melic (MELIC)	15
					Rattail fescue (VUMY)	11
					California bedstraw (GACA3)	10
					Blue oak (QUDO)	60
					Foothill pine (PISA2)	12
					Chilean bird's-foot trefoil (LOWR2)	10
					Soft brome (BRHO2)	6
					Silver hairgrass (AICA)	4
					California brome (BRCA5)	3
					Nodding needlegrass (NACE)	3
					Chaparral clarkia (CLAF)	2
					Spanish brome (BRMA3)	1
					Wild onion (ALLIU)	1
109:						
Rock outcrop, pinnacles of rhyolitic breccia	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
109:						
Highpeaks	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,800	1,500	1,200	Chamise (ADFA)	52
					Bigberry manzanita (ARGL4)	17
					Buckbrush (CECU)	17
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	21
					Silver hairgrass (AICA)	21
					Orange bush monkeyflower (DIAU)	10
					Soft brome (BRHO2)	7
					California maidenhair (ADJO)	5
					Smooth catsear (HYGL2)	5
					Sandberg bluegrass (POSE)	1
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Ripgut brome (BRDI3)	1
					Toyon (HEAR5)	1
Burgundy	Exposed, Rocky Slopes 17-19" P.z. R015XI110CA	225	150	75	Chamise (ADFA)	30
					Bushy spikemoss (SEBI)	32
					California buckwheat (ERFA2)	7
					Wild oat (AVFA)	4
					Rattail fescue (VUMY)	1
110:						
Knuckle	Exposed, Rocky Slopes 17-19" P.z. R015XI110CA	1,200	1,000	800	Chamise (ADFA)	59
					Bushy spikemoss (SEBI)	32
					Black sage (SAME3)	6
					California buckwheat (ERFA2)	5
					Wild oat (AVFA)	5
					Sandberg bluegrass (POSE)	2
					Rattail fescue (VUMY)	2
					Buckbrush (CECU)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
110:						
Chalone	Hills, South-Facing 17-19" P.z. R015XI100CA	1,400	1,200	100	Chamise (ADFA)	36
					Buckbrush (CECU)	17
					Bigberry manzanita (ARGL4)	15
					Hollyleaf cherry (PRIL)	11
					Scrub oak (QUBE5)	10
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	25
					Silver hairgrass (AICA)	21
					Sandberg bluegrass (POSE)	15
					Wild oat (AVFA)	10
					Soft brome (BRHO2)	7
					Orange bush monkeyflower (DIAU)	8
					California maidenhair (ADJO)	5
					Birchleaf mountain mahogany (CEMOG)	5
					Smooth catsear (HYGL2)	5
					Toyon (HEAR5)	4
					California ash (FRDI2)	3
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Ripgut brome (BRDI3)	1
Burgundy	Exposed, Rocky Slopes 17-19" P.z. R015XI110CA	225	150	75	Chamise (ADFA)	30
					Bushy spikemoss (SEBI)	32
					California buckwheat (ERFA2)	7
					Wild oat (AVFA)	4
					Rattail fescue (VUMY)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
111:						
Backdoor sandy loam	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Rattail fescue (VUMY)	20
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
Backdoor gravelly sandy loam	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,400	1,200	1,000	Chamise (ADFA)	36
					Buckbrush (CECU)	17
					Bigberry manzanita (ARGL4)	15
					Hollyleaf cherry (PRIL)	11
					Scrub oak (QUBE5)	10
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	25
					Silver hairgrass (AICA)	21
					Sandberg bluegrass (POSE)	15
					Soft brome (BRHO2)	7
					Orange bush monkeyflower (DIAU)	8
					California maidenhair (ADJO)	5
					Birchleaf mountain mahogany (CEMOG)	5
					Interior live oak (QUWI2)	5
					Smooth catsear (HYGL2)	5
					Toyon (HEAR5)	4
					California ash (FRDI2)	3
					Foothill pine (PISA2)	3
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Ripgut brome (BRDI3)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
111:						
Tuborcio	Quercus Douglasii/Nassella Pulchra F015XI200CA	2,200	2,000	1,800	Creeping snowberry (SYMO)	1
					Soft brome (BRHO2)	70
					Ripgut brome (BRDI3)	25
					Rattail fescue (VUMY)	24
					Wild oat (AVFA)	20
					Blue oak (QUDO)	50
					Spanish brome (BRMA3)	6
					Chilean bird's-foot trefoil (LOWR2)	3
					Sandberg bluegrass (POSE)	3
					Chaparral clarkia (CLAF)	3
					California bedstraw (GACA3)	2
					Minerslettuce (CLPE)	2
					Padre's shootingstar (DOCL)	2
					Smallflower melicgrass (MEIM)	2
112:						
Rimtrail	Clayey, Valley Flats 17-19" P.z. R015XI108CA	2,800	2,500	2,200	Soft brome (BRHO2)	84
					Ripgut brome (BRDI3)	32
					Wild oat (AVFA)	8
					Rattail fescue (VUMY)	6
					Redstem filaree (ERCI6)	5
					Spanish brome (BRMA3)	4
					Chaparral clarkia (CLAF)	4
					Prickly sowthistle (SOAS)	3
					Wild onion (ALLIU)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
113:						
Elder	Clayey, Valley Flats 17-19" P.z. R015XI108CA	3,500	3,000	2,500	Yellow star-thistle (CESO3)	65
					Coast Indian paintbrush (CAAF)	55
					Soft brome (BRHO2)	55
					Baltic rush (JUBA)	35
					Ripgut brome (BRDI3)	33
					Beardless wildrye (LETR5)	10
					Carex (CAREX)	10
					Chilean bird's-foot trefoil (LOWR2)	7
					Redstem filaree (ERCI6)	5
					Blue wildrye (ELGL)	2
					Toad rush (JUBU)	5
					Chaparral clarkia (CLAF)	4
					Purple needlegrass (NAPU4)	3
					California poppy (ESCA2)	2
					Annual hairgrass (DEDA)	2
					Meadow barley (HOBR2)	2
					Prickly sowthistle (SOAS)	2
					Spanish brome (BRMA3)	1
					Wild oat (AVFA)	1
					Wild onion (ALLIU)	1
Oxyaquic Haploxerolls, rarely flooded	Riparian Areas 17-19" P.z. R015XI103CA	2,800	2,500	2,200	Arroyo willow (SALA6)	15
					Coast Indian paintbrush (CAAF)	15
					Coyote willow (SAEX)	15
					Mule's fat (BASA4)	10
					Soft brome (BRHO2)	20
					Wild oat (AVFA)	20
					Pacific poison oak (TODI)	10
					Carex (CAREX)	10
					California blackberry (RUUR)	5
					Douglas sagewort (ARDO3)	5
					Rush (JUNCU)	5
					Fremont cottonwood (POFR2)	15
					California buckwheat (ERFA2)	5
					California sycamore (PLRA)	5
					Coyotebrush (BAPI)	5
					Red brome (BRRU2)	5
					Wooly yerba santa (ERTO)	2
					Blue elderberry (SANIC5)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	Lb/acre	Lb/acre		Pct
114:						
Ordeal	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Rattail fescue (VUMY)	20
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
Tuborcio	Quercus Douglasii/Nassella Pulchra F015XI200CA	2,200	2,000	1,800	Creeping snowberry (SYMO)	1
					Soft brome (BRHO2)	70
					Ripgut brome (BRDI3)	25
					Rattail fescue (VUMY)	24
					Wild oat (AVFA)	20
					Blue oak (QUDO)	50
					Spanish brome (BRMA3)	6
					Chilean bird's-foot trefoil (LOWR2)	3
					Sandberg bluegrass (POSE)	3
					Chaparral clarkia (CLAF)	3
					California bedstraw (GACA3)	2
					Minerslettuce (CLPE)	2
					Padre's shootingstar (DOCL)	2

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
114:						
Passion	Hills, South-Facing 17-19" P.z. R015XI100CA	1,000	800	600	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Rattail fescue (VUMY)	20
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
115:						
Tuborcio	Quercus Douglasii/Nassella Pulchra F015XI200CA	2,200	2,000	1,800	Creeping snowberry (SYMO)	1
					Soft brome (BRHO2)	70
					Ripgut brome (BRDI3)	25
					Rattail fescue (VUMY)	24
					Wild oat (AVFA)	20
					Blue oak (QUDO)	50
					Spanish brome (BRMA3)	6
					Chilean bird's-foot trefoil (LOWR2)	3
					Sandberg bluegrass (POSE)	3
					Chaparral clarkia (CLAF)	3
					California bedstraw (GACA3)	2
					Minerslettuce (CLPE)	2
					Padre's shootingstar (DOCL)	2

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
117:						
Elder-------------------	Clayey, Valley Flats 17-19" P.z. R015XI108CA	3,500	3,000	2,500	Yellow star-thistle (CESO3)----	65
					Soft brome (BRHO2)-------------	55
					Baltic rush (JUBA)-------------	35
					Ripgut brome (BRDI3)-----------	33
					Beardless wildrye (LETR5)------	10
					Carex (CAREX)------------------	10
					Chilean bird's-foot trefoil (LOWR2)-----------------------	7
					Redstem filaree (ERCI6)--------	5
					Blue wildrye (ELGL)------------	2
					California poppy (ESCA2)-------	5
					Toad rush (JUBU)---------------	5
					Chaparral clarkia (CLAF)-------	4
					Purple needlegrass (NAPU4)-----	3
					Annual hairgrass (DEDA)--------	2
					Meadow barley (HOBR2)----------	2
					Prickly sowthistle (SOAS)------	2
					Spanish brome (BRMA3)----------	1
					Wild oat (AVFA)----------------	1
					Wild onion (ALLIU)-------------	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
119:						
Still	Clayey, Valley Flats 17-19" P.z. R015XI108CA	2,800	2,500	2,200	Coyotebrush (BAPI)	10
					Arroyo willow (SALA6)	5
					Coyote willow (SAEX)	5
					Mule's fat (BASA4)	5
					California wildrose (ROCA2)	2
					Baltic rush (JUBA)	35
					Beardless wildrye (LETR5)	10
					Bulrush (SCIRP)	10
					Carex (CAREX)	10
					Ripgut brome (BRDI3)	10
					Soft brome (BRHO2)	10
					Chilean bird's-foot trefoil (LOWR2)	5
					Redstem filaree (ERCI6)	5
					Yellow star-thistle (CESO3)	5
					Blue wildrye (ELGL)	2
					Wild oat (AVFA)	35
					Interior live oak (QUWI2)	30
					Coast live oak (QUAG)	25
					Valley oak (QULO)	20
					California blackberry (RUUR)	5
					Douglas sagewort (ARDO3)	5
					Spanish brome (BRMA3)	5
					Blue elderberry (SANIC5)	5
					Flatsedge (CYPER)	5
					Meadow barley (HOBR2)	5
					Purple needlegrass (NAPU4)	5
					Spikerush (ELEOC)	5
					Toad rush (JUBU)	5
					Chaparral clarkia (CLAF)	4
					Annual hairgrass (DEDA)	2
					Wild onion (ALLIU)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	Lb/acre	Lb/acre		Pct
120:						
Elder	Clayey, Valley Flats 17-19" P.z. R015XI108CA	3,500	3,000	2,500	Yellow star-thistle (CESO3)	65
					Coast Indian paintbrush (CAAF)	55
					Soft brome (BRHO2)	55
					Baltic rush (JUBA)	35
					Ripgut brome (BRDI3)	33
					Beardless wildrye (LETR5)	10
					Carex (CAREX)	10
					Chilean bird's-foot trefoil (LOWR2)	7
					Redstem filaree (ERCI6)	5
					Blue wildrye (ELGL)	2
					Toad rush (JUBU)	5
					Chaparral clarkia (CLAF)	4
					Purple needlegrass (NAPU4)	3
					California poppy (ESCA2)	2
					Annual hairgrass (DEDA)	2
					Meadow barley (HOBR2)	2
					Prickly sowthistle (SOAS)	2
					Spanish brome (BRMA3)	1
					Wild oat (AVFA)	1
					Wild onion (ALLIU)	1
122:						
Tuborcio	Quercus Douglasii/Nassella Pulchra F015XI200CA	2,200	2,000	1,800	Creeping snowberry (SYMO)	1
					Soft brome (BRHO2)	70
					Ripgut brome (BRDI3)	25
					Rattail fescue (VUMY)	24
					Wild oat (AVFA)	20
					Blue oak (QUDO)	50
					Spanish brome (BRMA3)	6
					Chilean bird's-foot trefoil (LOWR2)	3
					Sandberg bluegrass (POSE)	3
					Chaparral clarkia (CLAF)	3
					California bedstraw (GACA3)	2
					Minerslettuce (CLPE)	2
					Padre's shootingstar (DOCL)	2
123:						
Teapot	Diatomaceous Hillslopes 17-19" P.z. R015XI106CA	1,100	800	500	Scrub oak (QUBE5)	32
					Chamise (ADFA)	28
					Interior live oak (QUWI2)	20
					Bigberry manzanita (ARGL4)	2
					Common deerweed (LOSC2)	3

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
123:						
Rock outcrop, diatomaceous mudstone--	---	---	---	---	---	
127:						
Argixerolls-------------	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)-----------------	60
					Red brome (BRRU2)--------------	55
					Common deerweed (LOSC2)--------	14
					Soft brome (BRHO2)-------------	6
					California buckwheat (ERFA2)---	5
					Rattail fescue (VUMY)----------	20
					Wooly yerba santa (ERTO)-------	20
					Smooth catsear (HYGL2)---------	8
					Maltese star-thistle (CEME2)---	5
					Buckbrush (CECU)---------------	5
					Chaparral clarkia (CLAF)-------	5
					Sandberg bluegrass (POSE)------	1
					Purple needlegrass (NAPU4)-----	1
					Rabbitfootgrass (POMO5)--------	1
					Silver hairgrass (AICA)--------	1
					Wild oat (AVFA)----------------	1
Rock outcrop, rhyolite--	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
127:						
Chalone	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,400	1,200	1,000	Chamise (ADFA)	36
					Buckbrush (CECU)	17
					Bigberry manzanita (ARGL4)	15
					Hollyleaf cherry (PRIL)	11
					Scrub oak (QUBE5)	10
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	25
					Silver hairgrass (AICA)	21
					Sandberg bluegrass (POSE)	15
					Wild oat (AVFA)	10
					Soft brome (BRHO2)	7
					California maidenhair (ADJO)	5
					Ripgut brome (BRDI3)	1
					Blue oak (QUDO)	10
					Orange bush monkeyflower (DIAU)	8
					Birchleaf mountain mahogany (CEMOG)	5
					Interior live oak (QUWI2)	5
					Smooth catsear (HYGL2)	5
					Toyon (HEAR5)	4
					California ash (FRDI2)	3
					Foothill pine (PISA2)	3
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
128:						
Still	Riparian Areas 17-19" P.z. R015XI103CA	2,800	2,500	2,200	Coyotebrush (BAPI)	10
					Arroyo willow (SALA6)	5
					Coyote willow (SAEX)	5
					Mule's fat (BASA4)	5
					California wildrose (ROCA2)	2
					Baltic rush (JUBA)	35
					Beardless wildrye (LETR5)	10
					Bulrush (SCIRP)	10
					Carex (CAREX)	10
					Ripgut brome (BRDI3)	10
					Soft brome (BRHO2)	10
					Chilean bird's-foot trefoil (LOWR2)	5
					Redstem filaree (ERCI6)	5
					Yellow star-thistle (CESO3)	5
					Blue wildrye (ELGL)	2
					Wild oat (AVFA)	35
					Interior live oak (QUWI2)	30
					Coast live oak (QUAG)	25
					Valley oak (QULO)	20
					California blackberry (RUUR)	5
					Douglas sagewort (ARDO3)	5
					Spanish brome (BRMA3)	5
					Blue elderberry (SANIC5)	5
					Flatsedge (CYPER)	5
					Meadow barley (HOBR2)	5
					Purple needlegrass (NAPU4)	5
					Spikerush (ELEOC)	5
					Toad rush (JUBU)	5
					Chaparral clarkia (CLAF)	4
					Annual hairgrass (DEDA)	2
					Wild onion (ALLIU)	1
Riverwash	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
131:						
Firstsister	Riparian Areas 17-19" P.z. R015XI103CA	2,000	1,750	1,500	Hollyleaf cherry (PRIL)	45
					Pacific poison oak (TODI)	20
					California buckeye (AECA)	18
					Toyon (HEAR5)	15
					Creeping snowberry (SYMO)	10
					Scrub oak (QUBE5)	5
					Sandberg bluegrass (POSE)	15
					Ripgut brome (BRDI3)	13
					Fringed redmaids (CACI2)	11
					Silver hairgrass (AICA)	10
					California maidenhair (ADJO)	9
					Orange bush monkeyflower (DIAU)	5
					California sycamore (PLRA)	45
					California live oak (QUAG)	25
					Wild oat (AVFA)	7
					Birchleaf mountain mahogany (CEMOG)	5
					Buckbrush (CECU)	5
					Foothill pine (PISA2)	5
					Goldback fern (PETR7)	5
					Minerslettuce (CLPE)	5
					Pipestem clematis (CLLA3)	5
					Rattail fescue (VUMY)	5
					Nested polypody (POCA26)	4
					Chamise (ADFA)	3
					California ash (FRDI2)	1
					Chaparral dodder (CUCA)	1
					Crinkled onion (ALCR5)	1
					Soft brome (BRHO2)	1
					Zigzag larkspur (DEPA3)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
131:						
Oxyaquic Haploxerolls, frequently flooded-----	Riparian Areas 17-19" P.z. R015XI103CA	2,800	2,500	2,200	Arroyo willow (SALA6)----------	15
					Coast Indian paintbrush (CAAF)	15
					Coyote willow (SAEX)-----------	15
					Mule's fat (BASA4)-------------	10
					Soft brome (BRHO2)-------------	20
					Wild oat (AVFA)----------------	20
					Pacific poison oak (TODI)------	10
					Carex (CAREX)------------------	10
					California blackberry (RUUR)---	5
					Douglas sagewort (ARDO3)-------	5
					Rush (JUNCU)-------------------	5
					Fremont cottonwood (POFR2)-----	15
					California buckwheat (ERFA2)---	5
					California sycamore (PLRA)-----	5
					Coyotebrush (BAPI)-------------	5
					Red brome (BRRU2)--------------	5
					Wooly yerba santa (ERTO)-------	2
					Blue elderberry (SANIC5)-------	1
Rock outcrop, rhyolite or breccia-------------	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
132:						
Toags	Upper Stream Terraces 17-19" P.z. R015XI107CA	1,400	1,000	600	Chamise (ADFA)	3
					Ripgut brome (BRDI3)	33
					Soft brome (BRHO2)	31
					Spanish brome (BRMA3)	10
					Rattail fescue (VUMY)	6
					Smooth catsear (HYGL2)	6
					California ragwort (SECA)	5
					Redstem filaree (ERCI6)	5
					California bedstraw (GACA3)	4
					California buckwheat (ERFA2)	1
					Interior live oak (QUWI2)	28
					California live oak (QUAG)	24
					Aster (ASTER)	10
					Foothill pine (PISA2)	10
					Willow (SALIX)	4
					Spring draba (DRVE2)	3
					Tall annual willowherb (EPBR3)	3
					California blackberry (RUUR)	1
					California wildrose (ROCA2)	1
					Bluewitch nightshade (SOUM)	1
					Common deerweed (LOSC2)	1
					Valley popcornflower (PLCA2)	1
Oxyaquic Haploxerolls, rarely flooded	Riparian Areas 17-19" P.z. R015XI103CA	2,800	2,500	2,200	Arroyo willow (SALA6)	15
					Coast Indian paintbrush (CAAF)	15
					Coyote willow (SAEX)	15
					Mule's fat (BASA4)	10
					Soft brome (BRHO2)	20
					Wild oat (AVFA)	20
					Pacific poison oak (TODI)	10
					Carex (CAREX)	10
					California blackberry (RUUR)	5
					Douglas sagewort (ARDO3)	5
					Rush (JUNCU)	5
					Fremont cottonwood (POFR2)	15
					California buckwheat (ERFA2)	5
					California sycamore (PLRA)	5
					Coyotebrush (BAPI)	5
					Red brome (BRRU2)	5
					Wooly yerba santa (ERTO)	2
					Blue elderberry (SANIC5)	1
Riverwash	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
133:						
Toags	Upper Stream Terraces 17-19" P.z. R015XI107CA	1,400	1,000	600	Silver lupine (LUAL4)	12
					Chamise (ADFA)	3
					Ripgut brome (BRDI3)	33
					Soft brome (BRHO2)	31
					Spanish brome (BRMA3)	10
					Rattail fescue (VUMY)	6
					Smooth catsear (HYGL2)	6
					California ragwort (SECA)	5
					Redstem filaree (ERCI6)	5
					California bedstraw (GACA3)	4
					California buckwheat (ERFA2)	1
					Interior live oak (QUWI2)	28
					California live oak (QUAG)	24
					Aster (ASTER)	10
					Foothill pine (PISA2)	10
					Willow (SALIX)	4
					Spring draba (DRVE2)	3
					Tall annual willowherb (EPBR3)	3
					California blackberry (RUUR)	1
					California wildrose (ROCA2)	1
					Bluewitch nightshade (SOUM)	1
					Common deerweed (LOSC2)	1
					Valley popcornflower (PLCA2)	1
Pinncamp	Quercus Lobata-Quercus Wislizeni/Carex Barbarae F015XI201CA	3,500	3,000	2,500	Santa Barbara sedge (CABA4)	80
					Ripgut brome (BRDI3)	22
					California bedstraw (GACA3)	5
					Soft brome (BRHO2)	5
					Valley oak (QULO)	50
					Interior live oak (QUWI2)	46
					Foothill pine (PISA2)	7
					Scarlet pimpernel (ANAR)	3
					Deergrass (MURI2)	1
134:						
Toags	Upper Stream Terraces 17-19" P.z. R015XI107CA	900	600	300	Silver lupine (LUAL4)	12
					Chamise (ADFA)	3
					Soft brome (BRHO2)	31
					Spanish brome (BRMA3)	10
					California ragwort (SECA)	5
					Redstem filaree (ERCI6)	5
					California buckwheat (ERFA2)	1
					Common deerweed (LOSC2)	1
					Aster (ASTER)	10
					Smooth catsear (HYGL2)	6

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	Lb/acre	Lb/acre		Pct
135:						
Toags	Upper Stream Terraces 17-19" P.z. R015XI107CA	1,400	1,000	600	Chamise (ADFA)	3
					Ripgut brome (BRDI3)	33
					Soft brome (BRHO2)	31
					Spanish brome (BRMA3)	10
					Rattail fescue (VUMY)	6
					Smooth catsear (HYGL2)	6
					California ragwort (SECA)	5
					Redstem filaree (ERCI6)	5
					California bedstraw (GACA3)	4
					California buckwheat (ERFA2)	1
					Interior live oak (QUWI2)	28
					California live oak (QUAG)	24
					Aster (ASTER)	10
					Foothill pine (PISA2)	10
					Willow (SALIX)	4
					Spring draba (DRVE2)	3
					Tall annual willowherb (EPBR3)	3
					California blackberry (RUUR)	1
					California wildrose (ROCA2)	1
					Bluewitch nightshade (SOUM)	1
					Common deerweed (LOSC2)	1
					Valley popcornflower (PLCA2)	1
Riverwash	---	---	---	---	---	---
136:						
Oxyaquic Haploxerolls, ponded	Riparian Areas 17-19" P.z. R015XI103CA	2,800	2,500	2,200	Arroyo willow (SALA6)	15
					Coast Indian paintbrush (CAAF)	15
					Coyote willow (SAEX)	15
					Mule's fat (BASA4)	10
					Soft brome (BRHO2)	20
					Wild oat (AVFA)	20
					Pacific poison oak (TODI)	10
					Carex (CAREX)	10
					California blackberry (RUUR)	5
					Douglas sagewort (ARDO3)	5
					Rush (JUNCU)	5
					Fremont cottonwood (POFR2)	15
					California buckwheat (ERFA2)	5
					California sycamore (PLRA)	5
					Coyotebrush (BAPI)	5
					Red brome (BRRU2)	5
					Wooly yerba santa (ERTO)	2
					Blue elderberry (SANIC5)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
138:						
Rock outcrop, rhyolite or breccia	---	---	---	---	---	---
Highpeaks	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,800	1,500	1,200	Chamise (ADFA)	52
					Bigberry manzanita (ARGL4)	17
					Buckbrush (CECU)	17
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	21
					Silver hairgrass (AICA)	21
					Soft brome (BRHO2)	7
					California maidenhair (ADJO)	5
					Orange bush monkeyflower (DIAU)	10
					Smooth catsear (HYGL2)	5
					Foothill pine (PISA2)	2
					Sandberg bluegrass (POSE)	1
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Ripgut brome (BRDI3)	1
					Toyon (HEAR5)	1
Chalone	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,400	1,200	1,000	Chamise (ADFA)	36
					Buckbrush (CECU)	17
					Bigberry manzanita (ARGL4)	15
					Hollyleaf cherry (PRIL)	11
					Scrub oak (QUBE5)	10
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	25
					Silver hairgrass (AICA)	21
					Sandberg bluegrass (POSE)	15
					Wild oat (AVFA)	10
					Soft brome (BRHO2)	7
					California maidenhair (ADJO)	5
					Blue oak (QUDO)	10
					Orange bush monkeyflower (DIAU)	8
					Birchleaf mountain mahogany (CEMOG)	5
					Interior live oak (QUWI2)	5
					Smooth catsear (HYGL2)	5
					Toyon (HEAR5)	4
					California ash (FRDI2)	3
					Foothill pine (PISA2)	3
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Ripgut brome (BRDI3)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
139:						
Highpeaks	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,800	1,500	1,200	Chamise (ADFA)	52
					Bigberry manzanita (ARGL4)	17
					Buckbrush (CECU)	17
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	21
					Silver hairgrass (AICA)	21
					Soft brome (BRHO2)	7
					California maidenhair (ADJO)	5
					Orange bush monkeyflower (DIAU)	10
					Smooth catsear (HYGL2)	5
					Foothill pine (PISA2)	2
					Sandberg bluegrass (POSE)	1
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Ripgut brome (BRDI3)	1
					Toyon (HEAR5)	1
Rock outcrop, rhyolitic breccia	---	---	---	---	---	---
142:						
Ordeal	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Rattail fescue (VUMY)	20
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
142:						
Longsfolly	Hills, South-Facing 17-19" P.z. R015XI100CA	1,400	1,200	1,000	Chamise (ADFA)	60
					Buckbrush (CECU)	34
					Silver hairgrass (AICA)	17
					Sandberg bluegrass (POSE)	10
					Goldback fern (PETR7)	6
					Rattail fescue (VUMY)	5
					Soft brome (BRHO2)	5
					Chaparral clarkia (CLAF)	5
					Interior live oak (QUWI2)	5
					California buckwheat (ERFA2)	3
					Foothill pine (PISA2)	3
					Rabbitfootgrass (POMO5)	1
					Red brome (BRRU2)	1
					Smooth catsear (HYGL2)	1
					Wild oat (AVFA)	1
Passion	Hills, South-Facing 17-19" P.z. R015XI100CA	1,000	800	600	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Rattail fescue (VUMY)	20
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
146:						
Badlands, scarps in conglomerate	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	Lb/acre	Lb/acre		Pct
148:						
Backdoor	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Rattail fescue (VUMY)	20
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
Tuborcio	Quercus Douglasii/Nassella Pulchra F015XI200CA	2,200	2,000	1,800	Creeping snowberry (SYMO)	1
					Soft brome (BRHO2)	70
					Ripgut brome (BRDI3)	25
					Rattail fescue (VUMY)	24
					Wild oat (AVFA)	20
					Blue oak (QUDO)	50
					Spanish brome (BRMA3)	6
					Chilean bird's-foot trefoil (LOWR2)	3
					Sandberg bluegrass (POSE)	3
					Chaparral clarkia (CLAF)	3
					California bedstraw (GACA3)	2
					Minerslettuce (CLPE)	2
					Padre's shootingstar (DOCL)	2
152:						
Backdoor	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Rattail fescue (VUMY)	20
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
155:						
Chalone-----------------	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,400	1,200	1,000	Chamise (ADFA)-----------------	36
					Buckbrush (CECU)---------------	17
					Bigberry manzanita (ARGL4)-----	15
					Hollyleaf cherry (PRIL)--------	11
					Scrub oak (QUBE5)--------------	10
					Pointleaf manzanita (ARPU5)----	6
					Rattail fescue (VUMY)----------	25
					Silver hairgrass (AICA)--------	21
					Sandberg bluegrass (POSE)------	15
					Wild oat (AVFA)----------------	10
					Soft brome (BRHO2)-------------	7
					Blue oak (QUDO)----------------	10
					Orange bush monkeyflower (DIAU)	8
					California maidenhair (ADJO)---	5
					Birchleaf mountain mahogany (CEMOG)----------------------	5
					Interior live oak (QUWI2)------	5
					Smooth catsear (HYGL2)---------	5
					Toyon (HEAR5)------------------	4
					California ash (FRDI2)---------	3
					Foothill pine (PISA2)----------	3
					Chaparral dodder (CUCA)--------	1
					Purple needlegrass (NAPU4)-----	1
					Rabbitfootgrass (POMO5)--------	1
					Ripgut brome (BRDI3)-----------	1
Knuckle-----------------	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)-----------------	59
					Bushy spikemoss (SEBI)---------	32
					Black sage (SAME3)-------------	6
					California buckwheat (ERFA2)---	5
					Wild oat (AVFA)----------------	5
					Sandberg bluegrass (POSE)------	2
					Rattail fescue (VUMY)----------	2
					Buckbrush (CECU)---------------	1
					Purple needlegrass (NAPU4)-----	1
					Rabbitfootgrass (POMO5)--------	1
Rock outcrop, rhyolite--	---	---	---	---	---	---

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
156:						
Chalone	Upper, North-Facing Slopes 17-19" P.z. R015XI101CA	1,400	1,200	1,000	Chamise (ADFA)	36
					Buckbrush (CECU)	17
					Bigberry manzanita (ARGL4)	15
					Hollyleaf cherry (PRIL)	11
					Scrub oak (QUBE5)	10
					Pointleaf manzanita (ARPU5)	6
					Rattail fescue (VUMY)	25
					Silver hairgrass (AICA)	21
					Sandberg bluegrass (POSE)	15
					Soft brome (BRHO2)	7
					Orange bush monkeyflower (DIAU)	8
					California maidenhair (ADJO)	5
					Birchleaf mountain mahogany (CEMOG)	5
					Blue oak (QUDO)	5
					Interior live oak (QUWI2)	5
					Smooth catsear (HYGL2)	5
					Toyon (HEAR5)	4
					California ash (FRDI2)	3
					Foothill pine (PISA2)	3
					Chaparral dodder (CUCA)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Ripgut brome (BRDI3)	1
Knuckle	Hills, South-Facing 17-19" P.z. R015XI100CA	1,200	1,000	800	Chamise (ADFA)	59
					Bushy spikemoss (SEBI)	32
					Black sage (SAME3)	6
					California buckwheat (ERFA2)	5
					Wild oat (AVFA)	5
					Sandberg bluegrass (POSE)	2
					Rattail fescue (VUMY)	2
					Buckbrush (CECU)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
156:						
Firstsister	Footslopes & Backslopes 17-19" P.z. R015XI105CA	2,000	1,750	1,500	California sycamore (PLRA)	45
					Hollyleaf cherry (PRIL)	45
					Blue oak (QUDO)	42
					California live oak (QUAG)	25
					California buckeye (AECA)	18
					Buckbrush (CECU)	18
					Pacific poison oak (TODI)	15
					Scrub oak (QUBE5)	14
					Ripgut brome (BRDI3)	13
					Sandberg bluegrass (POSE)	12
					Fringed redmaids (CACI2)	11
					Rattail fescue (VUMY)	10
					Silver hairgrass (AICA)	10
					California maidenhair (ADJO)	9
					California juniper (JUCA7)	8
					Pipestem clematis (CLLA3)	8
					Wild oat (AVFA)	7
					Goldback fern (PETR7)	5
					Toyon (HEAR5)	5
					Minerslettuce (CLPE)	4
					Nested polypody (POCA26)	4
					Chamise (ADFA)	3
					Creeping snowberry (SYMO)	3
					California ash (FRDI2)	1
					Birchleaf mountain mahogany (CEMOG)	1
					Chaparral dodder (CUCA)	1
					Crinkled onion (ALCR5)	1
					Foothill pine (PISA2)	1
					Orange bush monkeyflower (DIAU)	1
					Soft brome (BRHO2)	1
					Zigzag larkspur (DEPA3)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
PgE:						
Pinnacles	Hills, South-Facing 17-19" P.z. R015XI100CA	1,000	800	600	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
PhG2:						
Pinnacles	Hills, South-Facing 17-19" P.z. R015XI100CA	800	600	400	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production			Characteristic vegetation	Species composition (by weight)
		Favorable year	Normal year	Unfavorable year		
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
PnE2:						
Pinnacles	Hills, South-Facing 17-19" P.z. R015XI100CA	1,000	800	600	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1
PnG3:						
Pinnacles	Hills, South-Facing 17-19" P.z. R015XI100CA	1,000	800	600	Chamise (ADFA)	60
					Red brome (BRRU2)	55
					Common deerweed (LOSC2)	14
					Soft brome (BRHO2)	6
					California buckwheat (ERFA2)	5
					Wooly yerba santa (ERTO)	20
					Smooth catsear (HYGL2)	8
					Maltese star-thistle (CEME2)	5
					Buckbrush (CECU)	5
					Chaparral clarkia (CLAF)	5
					Sandberg bluegrass (POSE)	1
					Purple needlegrass (NAPU4)	1
					Rabbitfootgrass (POMO5)	1
					Silver hairgrass (AICA)	1
					Wild oat (AVFA)	1

Table 6.--Rangeland Ecological Sites, Productivity, and Characteristic Vegetation--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Total dry-weight production: Normal year	Total dry-weight production: Unfavorable year	Characteristic vegetation	Species composition (by weight)
		Lb/acre	*Lb/acre*	*Lb/acre*		*Pct*
SdG3:						
Santa Lucia-------------	Hills, South-Facing 17-19" P.z. R015XI100CA	1,400	1,100	800	Chamise (ADFA)-----------------	60
					Red brome (BRRU2)--------------	55
					Common deerweed (LOSC2)--------	14
					Soft brome (BRHO2)-------------	6
					California buckwheat (ERFA2)---	5
					Wooly yerba santa (ERTO)-------	20
					Smooth catsear (HYGL2)---------	8
					Maltese star-thistle (CEME2)---	5
					Buckbrush (CECU)---------------	5
					Chaparral clarkia (CLAF)-------	5
					Sandberg bluegrass (POSE)------	1
					Purple needlegrass (NAPU4)-----	1
					Rabbitfootgrass (POMO5)--------	1
					Silver hairgrass (AICA)--------	1
					Wild oat (AVFA)----------------	1

Table 7a.--Urban and Recreational Uses (Part 1)

(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. The rating is based on the limitation with the highest value. Only the three limitations with the highest value are listed. There may be more limitations. Fine-earth fraction and coarse fragment content are given on a weight basis. A brief summary of the rating criteria is given at the end of the table)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Limitations	Value	Limitations	Value	Limitations	Value
101:							
Ordeal	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00
Passion	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Surface fragments (<3") >25 percent	1.00
Badlands	10	Not rated		Not rated		Not rated	
104:							
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") >50 percent	1.00	Fragments (<3") >50 percent	1.00	Depth to bedrock <20"	1.00
Burgundy	25	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (<3") >50 percent	1.00	Fragments (<3") >50 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
Argixerolls	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.26	Fragments (<3") 25 to 50 percent	0.26	Fragments (>10") >3 percent	1.00
105:							
Chalone	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (<3") >50 percent	1.00	Fragments (<3") >50 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00
Firstsister	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
Highpeaks	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00
106:							
Casino	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Dusty	0.50	Dusty	0.50	Bedrock at 20-40" and slope >2 percent	0.50
		Permeability 0.06-0.6"/hr	0.50	Permeability 0.06-0.6"/hr	0.50	Dusty	0.50

Table 7a.--Urban and Recreational Uses (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Limitations	Value	Limitations	Value	Limitations	Value
106:							
Argixerolls	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
		Fragments (<3") >50 percent	1.00	Fragments (<3") >50 percent	1.00	Surface fragments (<3") >25 percent	1.00
107:							
Casino	70	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.50	Permeability 0.06-0.6"/hr	0.50	Bedrock at 20-40" and slope >2 percent	0.50
						Permeability 0.06-0.6"/hr	0.50
109:							
Rock outcrop, pinnacles of rhyolitic breccia	35	Not rated		Not rated		Not rated	
Highpeaks	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
						Surface fragments (<3") >25 percent	0.99
Burgundy	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (<3") >50 percent	1.00	Fragments (<3") >50 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
110:							
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Depth to bedrock <20"	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Fragments (>10") >3 percent	1.00
Chalone	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00
						Bedrock at 20-40" and slope >2 percent	0.50
Burgundy	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.68	Fragments (<3") 25 to 50 percent	0.68	Depth to bedrock <20"	1.00
111:							
Backdoor sandy loam	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
Backdoor gravelly sandy loam	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (<3") 25 to 50 percent	0.84	Fragments (<3") 25 to 50 percent	0.84	Surface fragments (<3") >25 percent	1.00
Tuborcio	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.08	Fragments (<3") 25 to 50 percent	0.08	Permeability 0.06-0.6"/hr	0.46

Table 7a.--Urban and Recreational Uses (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Limitations	Value	Limitations	Value	Limitations	Value
112:							
Rimtrail	85	No limitations		No limitations		Slopes 2 to 6 percent	0.26
113:							
Elder	40	Flooding >/= rare	1.00	No limitations		Slopes 2 to 6 percent	0.50
						Occasional flooding	0.50
Oxyaquic Haploxerolls, rarely flooded	40	Flooding >/= rare	1.00	No limitations		Slopes 2 to 6 percent	0.50
114:							
Ordeal	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
						Surface fragments (<3") 10 to 25 percent	0.32
Tuborcio	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
Passion	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36
115:							
Tuborcio	80	Dusty	0.50	Dusty	0.50	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Dusty	0.50
		Slopes 8 to 15 percent	0.37	Slopes 8 to 15 percent	0.37	Permeability 0.06-0.6"/hr	0.46
117:							
Elder	80	Fragments (<3") 25 to 50 percent	0.39	Fragments (<3") 25 to 50 percent	0.39	Surface fragments (<3") >25 percent	1.00
119:							
Still	80	Surface clay >/= 40 percent	1.00	Surface clay >/= 40 percent	1.00	Surface clay >/= 40 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
120:							
Elder	80	No limitations		No limitations		Surface fragments (<3") 10 to 25 percent	0.32
						Slopes 2 to 6 percent	0.02
122:							
Tuborcio	80	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
123:							
Teapot	60	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (<3") >50 percent	1.00	Fragments (<3") >50 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated		Not rated	

Table 7a.--Urban and Recreational Uses (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
127:							
Argixerolls	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.26	Fragments (<3") 25 to 50 percent	0.26	Fragments (>10") >3 percent	1.00
Rock outcrop, rhyolite	20	Not rated		Not rated		Not rated	
Chalone	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00
						Bedrock 20-40" and slope >2 percent	0.50
128:							
Still	70	No limitations		No limitations		No limitations	
Riverwash	20	Not rated		Not rated		Not rated	
131:							
Firstsister	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00
Oxyaquic Haploxerolls, frequently flooded	15	Flooding >/= rare	1.00	Frequent flooding	0.50	Flooding >occasional	1.00
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated		Not rated	
132:							
Toags	50	Fragments (<3") 25 to 50 percent	0.39	Fragments (<3") 25 to 50 percent	0.39	Surface fragments (<3") >25 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36
Oxyaquic Haploxerolls, rarely flooded	20	Flooding >/= rare	1.00	No limitations		No limitations	
Riverwash	15	Not rated		Not rated		Not rated	
133:							
Toags	50	Surface sand fraction 70 to 90 percent by weight	0.95	Surface sand fraction 70 to 90 percent by weight	0.95	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.05	Fragments (<3") 25 to 50 percent	0.05	Surface sand fraction 70 to 90 percent by weight	0.95
						Slopes 2 to 6 percent	0.50
Pinncamp	30	No limitations		No limitations		Slopes 2 to 6 percent	0.50

Table 7a.--Urban and Recreational Uses (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Limitations	Value	Picnic areas: Limitations	Value	Playgrounds: Limitations	Value
134:							
Toags	70	Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.39	Fragments (<3") 25 to 50 percent	0.39	Fragments (>10") >3 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36	Slopes 2 to 6 percent	0.98
135:							
Toags	50	Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.05	Fragments (<3") 25 to 50 percent	0.05	Slopes 2 to 6 percent	0.98
						Surface sand fraction 70 to 90 percent by weight	0.36
Riverwash	35	Not rated		Not rated		Not rated	
136:							
Oxyaquic Haploxerolls, ponded	90	Saturated within 18"	1.00	Saturated within 12"	1.00	Saturated within 18"	1.00
		Ponded (any duration)	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Surface clay >/= 40 percent	1.00	Surface clay >/= 40 percent	1.00	Surface clay >/= 40 percent	1.00
138:							
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated		Not rated	
Highpeaks	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Surface fragments (<3") >25 percent	1.00
Chalone	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Dusty	0.50	Dusty	0.50	Surface fragments (<3") >25 percent	1.00
		Fragments >10" 0.1 to 3.0 percent	0.19	Fragments >10" 0.1 to 3.0 percent	0.19	Bedrock 20-40" and slope >2 percent	0.50
139:							
Highpeaks	75	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
						Surface fragments (<3") >25 percent	0.99
Rock outcrop, rhyolitic breccia	15	Not rated		Not rated		Not rated	
142:							
Ordeal	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36
						Surface fragments (<3") 10 to 25 percent	0.22

Table 7a.--Urban and Recreational Uses (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Limitations	Value	Picnic areas: Limitations	Value	Playgrounds: Limitations	Value
142:							
Longsfolly	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36	Surface fragments (<3") >25 percent	1.00
		Fragments (<3") 25 to 50 percent	0.05	Fragments (<3") 25 to 50 percent	0.05	Surface sand fraction 70 to 90 percent by weight	0.36
Passion	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Surface fragments (<3") >25 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	Surface sand fraction 70 to 90 percent by weight	0.36	Depth to bedrock <20"	1.00
146:							
Badlands, scarps in conglomerate	90	Not rated		Not rated		Not rated	
148:							
Backdoor	55	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Tuborcio	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
152:							
Backdoor	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
						Surface fragments (<3") 10 to 25 percent	0.32
155:							
Chalone	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") 0.1 to 3.0 percent	0.76	Fragments (>10") 0.1 to 3.0 percent	0.76	Fragments (>3") >30 percent	1.00
		Fragments (>3") 25 to 75 percent	0.08	Fragments (>3") 25 to 75 percent	0.08	Surface fragments (<3") 10 to 25 percent	0.98
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00
Rock outcrop, rhyolite	15	Not rated		Not rated		Not rated	
156:							
Chalone	45	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
						Bedrock 20-40" and slope >2 percent	0.50
Knuckle	25	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (>10") >3 percent	1.00	Depth to bedrock <20"	1.00
		Depth to bedrock <20"	1.00	Depth to bedrock <20"	1.00	Fragments (>10") >3 percent	1.00
Firstsister	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Fragments (<3") >50 percent	1.00	Fragments (<3") >50 percent	1.00	Surface fragments (<3") >25 percent	1.00

Table 7a.--Urban and Recreational Uses (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Limitations	Value	Limitations	Value	Limitations	Value
PgE:							
Pinnacles---------------	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
						Fragments (>3") 5 to 30 percent	0.01
PhG2:							
Pinnacles---------------	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Fragments (>3") 5 to 30 percent	0.97
		Fragments >3" 25 to 75 percent	0.01	Fragments >3" 25 to 75 percent	0.01	Permeability 0.06-0.6"/hr	0.46
PnE2:							
Pinnacles---------------	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
						Surface fragments (<3") 10 to 25 percent	0.04
PnG3:							
Pinnacles---------------	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46	Permeability 0.06-0.6"/hr	0.46
						Surface fragments (<3") 10 to 25 percent	0.04
SdG3:							
Santa Lucia-------------	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >6 percent	1.00
		Dusty	0.50	Dusty	0.50	Bedrock 20-40" and slope >2 percent	0.50
		Permeability 0.06-0.6"/hr	0.49	Permeability 0.06-0.6"/hr	0.49	Dusty	0.50

The interpretations for camp areas evaluate the following soil properties at varying depths in the soil: Flooding; ponding; wetness; slope; depth to bedrock; depth to cemented pan; fragments less than, equal to, or greater than 3 inches in size; sodium content (SAR); salinity (EC); clayey surface texture; Unified classes for high organic matter content (PT, OL, OH); soil dustiness; and permeability (Ksat) that is too high, resulting in seepage in some climates.

The interpretations for picnic areas evaluate the following soil properties at varying depths in the soil: Flooding, ponding, wetness, slope, depth to bedrock, depth to cemented pan, salinity (EC), soil pH, soil dustiness, fragments greater than 3 inches in size, surface fragments greater than 10 inches in size, content of sand or clay in the surface layer, Unified classes for high organic matter content (PT, OL, OH), and permeability (Ksat) that is too high, resulting in seepage in some climates.

The interpretations for playgrounds evaluate the following soil properties at varying depths in the soil: Flooding, ponding, wetness, slope, depth to bedrock, depth to cemented pan, surface fragments greater than 10 inches in size, fragments equal to or less than 3 inches in size, Unified class for high organic matter content (PT, OL, OH), soil dustiness, content of sand or clay in the surface layer, soil pH, salinity (EC), and permeability (Ksat) that is too high, resulting in seepage in some climates.

Table 7b.--Urban and Recreational Uses (Part 2)

(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. The rating is based on the limitation with the highest value. Only the three limitations with the highest value are listed. There may be more limitations. Fine-earth fraction and coarse fragment content are reported on a weight basis. A brief summary of the rating criteria is given at the end of the table)

Map symbol and soil name	Pct. of map unit	Paths and trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value
101:					
Ordeal------------------	50	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") >3 percent	1.00	AWC <2" to 40"	1.00
				Depth to bedrock 20 to 40"	0.05
Passion-----------------	30	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Slopes >15 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	AWC <2" to 40"	1.00
Badlands----------------	10	Not rated		Not rated	
104:					
Knuckle-----------------	35	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Slopes >15 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.59	AWC <2" to 40"	1.00
Burgundy----------------	25	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Surface fragments (<3") >65 percent	1.00	Slopes >15 percent	1.00
				Fragments (gravel-sized) >50 percent	1.00
Argixerolls-------------	15	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") >3 percent	1.00	AWC 2-4" to depth of 40"	0.98
				Depth to bedrock 20 to 40"	0.74
105:					
Chalone-----------------	35	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") >3 percent	1.00	Fragments (gravel-sized) >50 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.88	AWC <2" to 40"	1.00
Firstsister-------------	35	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				AWC 2-4" to depth of 40"	0.68
Highpeaks---------------	20	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Slopes >15 percent	1.00
				AWC <2" to 40"	1.00
106:					
Casino------------------	50	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Dusty	0.50	Depth to bedrock 20 to 40"	0.04
Argixerolls-------------	30	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") 0.1 to 3.0 percent	0.76	Slopes >15 percent	1.00
		Dusty	0.50	AWC <2" to 40"	1.00
107:					
Casino------------------	70	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				Depth to bedrock 20 to 40"	0.32
109:					
Rock outcrop, pinnacles of rhyolitic breccia---	35	Not rated		Not rated	
Highpeaks---------------	35	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
				Slopes >15 percent	1.00
				AWC <2" to 40"	1.00
Burgundy----------------	20	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Surface fragments (<3") >65 percent	1.00	Slopes >15 percent	1.00
				AWC <2" to 40"	1.00

Table 7b.--Urban and Recreational Uses (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value
110:					
Knuckle	35	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Slopes >15 percent	1.00
				AWC <2" to 40"	1.00
Chalone	30	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") >3 percent	1.00	Depth to bedrock 20 to 40"	0.71
				AWC 2-4" to depth of 40"	0.20
Burgundy	20	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
				Slopes >15 percent	1.00
				AWC <2" to 40"	1.00
111:					
Backdoor sandy loam	35	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				AWC 2-4" to depth of 40"	0.01
Backdoor gravelly sandy loam	30	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				Fragments (gravel sized) 25 to 50 percent	0.84
Tuborcio	20	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				Fragments (gravel sized) 25 to 50 percent	0.08
112:					
Rimtrail	85	No limitations		No limitations	
113:					
Elder	40	No limitations		Occasional flooding	0.80
Oxyaquic Haploxerolls, rarely flooded	40	No limitations		AWC 2-4" to depth of 40"	0.74
114:					
Ordeal	40	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				AWC <2" to 40"	0.99
				Depth to bedrock 20 to 40"	0.50
Tuborcio	35	Slopes >25 percent	1.00	Slopes >15 percent	1.00
Passion	15	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	Slopes >15 percent	1.00
				AWC <2" to 40"	1.00
115:					
Tuborcio	80	Dusty	0.50	Slopes 8 to 15 percent	0.37
117:					
Elder	80	No limitations		Fragments (gravel sized) 25 to 50 percent	0.38
				AWC 2-4" to depth of 40"	0.23
119:					
Still	80	Surface clay >/= 40 percent	1.00	Surface clay >/= 40 percent	1.00
120:					
Elder	80	No limitations		AWC 2-4" to depth of 40"	0.01
122:					
Tuborcio	80	Slopes >25 percent	1.00	Slopes >15 percent	1.00
123:					
Teapot	60	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Dusty	0.50	Fragments (gravel-sized) >50 percent	1.00
				AWC 2-4" to depth of 40"	0.72
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated	

Table 7b.--Urban and Recreational Uses (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Limitations	Value	Lawns, landscaping, and golf fairways: Limitations	Value
127:					
Argixerolls	50	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") >3 percent	1.00	AWC <2" to 40"	0.99
				Depth to bedrock 20 to 40"	0.65
Rock outcrop, rhyolite	20	Not rated		Not rated	
Chalone	15	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") >3 percent	1.00	Depth to bedrock <20"	0.99
				AWC 2-4" to depth of 40"	0.91
128:					
Still	70	No limitations		No limitations	
Riverwash	20	Not rated		Not rated	
131:					
Firstsister	50	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") >3 percent	1.00	AWC 2-4" to depth of 40"	0.33
Oxyaquic Haploxerolls, frequently flooded	15	Frequent flooding	0.50	Frequent flooding	0.90
				AWC 2-4" to depth of 40"	0.01
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated	
132:					
Toags	50	Surface sand fraction 70 to 90 percent by weight	0.36	Coarse sand or sand surface	1.00
				AWC 2-4" to depth of 40"	0.86
				Fragments (gravel sized) 25 to 50 percent	0.38
Oxyaquic Haploxerolls, rarely flooded	20	No limitations		AWC 2-4" to depth of 40"	0.70
Riverwash	15	Not rated		Not rated	
133:					
Toags	50	Surface sand fraction 70 to 90 percent by weight	0.95	Coarse sand or sand surface	1.00
				AWC 2-4" to depth of 40"	0.62
				Fragments (gravel sized) 25 to 50 percent	0.05
Pinncamp	30	No limitations		AWC 2-4" to depth of 40"	0.55
134:					
Toags	70	Fragments (>10") >3 percent	1.00	Coarse sand or sand surface	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	AWC 2-4" to depth of 40"	0.88
				Fragments (gravel sized) 25 to 50 percent	0.38
135:					
Toags	50	Surface sand fraction 70 to 90 percent by weight	0.36	AWC 2-4" to depth of 40"	0.62
				Fragments (gravel sized) 25 to 50 percent	0.05
Riverwash	35	Not rated		Not rated	
136:					
Oxyaquic Haploxerolls, ponded	90	Saturated within 12"	1.00	Ponded (any duration)	1.00
		Ponded (any duration)	1.00	Saturated within 12"	1.00
		Surface clay >/= 40 percent	1.00	Surface clay >/= 40 percent	1.00
138:					
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated	
Highpeaks	30	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Slopes >15 percent	1.00
		Dusty	0.50	AWC <2" to 40"	1.00

Table 7b.--Urban and Recreational Uses (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value
138:					
Chalone	15	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Dusty	0.50	AWC 2-4" to depth of 40"	0.98
		Fragments (>10") 0.1 to 3.0 percent	0.19	Depth to bedrock 20 to 40"	0.90
139:					
Highpeaks	75	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
				Slopes >15 percent	1.00
				AWC <2" to 40"	1.00
Rock outcrop, rhyolitic breccia	15	Not rated		Not rated	
142:					
Ordeal	40	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	AWC 2-4" to depth of 40"	0.97
				Depth to bedrock 20 to 40"	0.05
Longsfolly	35	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	AWC 2-4" to depth of 40"	0.75
				Fragments (gravel sized) 25 to 50 percent	0.05
Passion	15	Slopes 15 to 25 percent	0.82	Depth to bedrock <20"	1.00
		Surface sand fraction 70 to 90 percent by weight	0.36	AWC <2" to 40"	1.00
				Slopes >15 percent	1.00
146:					
Badlands, scarps in conglomerate	90	Not rated		Not rated	
148:					
Backdoor	55	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Dusty	0.50	AWC 2-4" to depth of 40"	0.01
Tuborcio	30	Slopes >25 percent	1.00	Slopes >15 percent	1.00
152:					
Backdoor	85	No limitations		Slopes >15 percent	1.00
155:					
Chalone	40	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>10") 0.1 to 3.0 percent	0.76	Fragments (>3") >30 percent	1.00
				AWC <2" to 40"	0.99
		Fragments (>3") 25 to 75 percent	0.08		
Knuckle	35	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
				Slopes >15 percent	1.00
				AWC <2" to 40"	1.00
Rock outcrop, rhyolite	15	Not rated		Not rated	
156:					
Chalone	45	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				Depth to bedrock 20 to 40"	0.02
Knuckle	25	Slopes >25 percent	1.00	Depth to bedrock <20"	1.00
		Fragments (>10") >3 percent	1.00	Slopes >15 percent	1.00
		Surface sand fraction 70 to 90 percent by weight	0.59	AWC <2" to 40"	1.00
Firstsister	15	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Surface fragments (<3") >65 percent	1.00	Fragments (gravel sized) >50 percent	1.00
				AWC 2-4" to depth of 40"	0.90
PgE:					
Pinnacles	85	K factor >0.35 and slopes >8 percent	1.00	Slopes >15 percent	1.00
				Depth to bedrock 20 to 40"	0.46
		Slopes 15 to 25 percent	0.18	AWC 2-4" to depth of 40"	0.23

Table 7b.--Urban and Recreational Uses (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value
PhG2:					
Pinnacles---------------	50	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Fragments (>3") 25 to 75 percent	0.01	Fragments (>3") 5 to 30 percent	0.97
				Depth to bedrock 20 to 40"	0.46
PnE2:					
Pinnacles---------------	85	Slopes 15 to 25 percent	0.92	Slopes >15 percent	1.00
				Depth to bedrock 20 to 40"	0.84
				AWC 2-4" to depth of 40"	0.22
PnG3:					
Pinnacles---------------	85	Slopes >25 percent	1.00	Slopes >15 percent	1.00
				Depth to bedrock 20 to 40"	0.84
				AWC 2-4" to depth of 40"	0.22
SdG3:					
Santa Lucia-------------	85	Slopes >25 percent	1.00	Slopes >15 percent	1.00
		Dusty	0.50	AWC <2" to 40"	1.00
				Depth to bedrock 20 to 40"	0.42

The interpretations for paths and trails evaluate the following soil properties at varying depths in the soil: Flooding; ponding; wetness; slope; fragments less than, equal to, or greater than 3 inches in diameter; clay and sand content in the surface layer; fragments on the surface greater than or equal to 10 inches in diameter; Unified classes for high organic matter content (PT, OL, OH); soil dustiness; and the risk of erosion by water.

The interpretations for lawns, landscaping, and golf fairways evaluate the following soil properties at varying depths in the soil: Flooding; ponding; wetness; slope; depth to bedrock; depth to a cemented pan; fragments greater than, equal to, or less than 3 inches in diameter; Unified class for high organic matter content (PT, OL, OH); soil dustiness; sand or clay surface content; surface fragments greater than or equal to 10 inches in diameter; soil pH; salinity (EC); sodium content (SAR); and content of calcium carbonates and sulfur.

Table 8a.--Building Site Development (Part 1)

(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. The rating is based on the limitation with the highest value. Only the three limitations with the highest value are listed. There may be more limitations. Fine-earth fraction and coarse fragment content are given on a weight basis. A brief summary of the rating criteria and a definition of some of the abbreviations are given at the end of the table)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
101:							
Ordeal	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
				Bedrock (soft) at 20 to 40"	0.05		
Passion	30	Bedrock (soft) at <20"	1.00	Slopes >15 percent	1.00	Bedrock (soft) at <20"	1.00
		Slopes >15 percent	1.00	Bedrock (soft) at <20"	1.00	Slopes >8 percent	1.00
Badlands	10	Not rated		Not rated		Not rated	
104:							
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
Burgundy	25	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
Argixerolls	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at 20 to 40"	0.74	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.74
		Shrink-swell (LEP 3 to 6)	0.01			Shrink-swell (LEP 3 to 6)	0.01
105:							
Chalone	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	0.99	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	0.99
Firstsister	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
Highpeaks	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
106:							
Casino	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
		Bedrock (hard) at 20 to 40"	0.04	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.04
Argixerolls	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
		Shrink-swell (LEP 3 to 6)	0.50	Shrink-swell (LEP 3 to 6)	0.50	Shrink-swell (LEP 3 to 6)	0.50
107:							
Casino	70	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
		Bedrock (hard) at 20 to 40"	0.32	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.32

Table 8a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Limitations	Value	Dwellings with basements: Limitations	Value	Small commercial buildings: Limitations	Value
109:							
Rock outcrop, pinnacles of rhyolitic breccia---	35	Not rated		Not rated		Not rated	
Highpeaks---------------	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
Burgundy----------------	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
110:							
Knuckle-----------------	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
Chalone-----------------	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at 20 to 40"	0.71	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.71
Burgundy----------------	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
111:							
Backdoor sandy loam-----	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
Backdoor gravelly sandy loam------------------	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
Tuborcio----------------	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.50	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP 3 to 6)	0.50
112:							
Rimtrail----------------	85	No limitations		No limitations		No limitations	
113:							
Elder-------------------	40	Flooding >/= rare	1.00	Flooding >/= rare	1.00	Flooding >/= rare	1.00
						Slopes 4 to 8 percent	0.02
Oxyaquic Haploxerolls, rarely flooded---------	40	Flooding >/= rare	1.00	Flooding >/= rare	1.00	Flooding >/= rare	1.00
				Saturated from 2.5 to 6.0'	0.98	Slopes 4 to 8 percent	0.02
114:							
Ordeal------------------	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
				Bedrock (soft) at 20 to 40"	0.50		
Tuborcio----------------	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
Passion-----------------	15	Bedrock (soft) at <20"	1.00	Slopes >15 percent	1.00	Bedrock (soft) at <20"	1.00
		Slopes >15 percent	1.00	Bedrock (soft) at <20"	1.00	Slopes >8 percent	1.00
115:							
Tuborcio----------------	80	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Slopes >8 percent	1.00
		Slopes 8 to 15 percent	0.37	Slopes 8 to 15 percent	0.37	Shrink-swell (LEP >6)	1.00

Table 8a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
117:							
Elder	80	No limitations		No limitations		No limitations	
119:							
Still	80	Shrink-swell (LEP 3 to 6)	0.50	No limitations		Shrink-swell (LEP 3 to 6)	0.50
120:							
Elder	80	No limitations		No limitations		No limitations	
122:							
Tuborcio	80	Slopes >15 percent Shrink-swell (LEP >6)	1.00 1.00	Slopes >15 percent Shrink-swell (LEP >6)	1.00 1.00	Slopes >8 percent Shrink-swell (LEP >6)	1.00 1.00
123:							
Teapot	60	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated		Not rated	
127:							
Argixerolls	50	Slopes >15 percent Bedrock (hard) at 20 to 40"	1.00 0.64	Slopes >15 percent Bedrock (hard) at <40"	1.00 1.00	Slopes >8 percent Bedrock (hard) at 20 to 40"	1.00 0.64
Rock outcrop, rhyolite	20	Not rated		Not rated		Not rated	
Chalone	15	Slopes >15 percent Bedrock (hard) at <20" Fragments (>3") 25 to 50 percent	1.00 0.99 0.39	Slopes >15 percent Bedrock (hard) at <40" Fragments (>3") 25 to 50 percent	1.00 1.00 0.39	Slopes >8 percent Bedrock (hard) at <20" Fragments (>3") 25 to 50 percent	1.00 0.99 0.39
128:							
Still	70	No limitations		Shrink-swell (LEP 3 to 6)	0.50	No limitations	
Riverwash	20	Flooding >/= rare Saturated within 18"	1.00 1.00	Flooding >/= rare Saturated within 2.5'	1.00 1.00	Flooding >/= rare Saturated within 18"	1.00 1.00
131:							
Firstsister	50	Slopes >15 percent Fragments (>3") 25 to 50 percent	1.00 0.59	Slopes >15 percent Fragments (>3") 25 to 50 percent	1.00 0.59	Slopes >8 percent Fragments (>3") 25 to 50 percent	1.00 0.59
Oxyaquic Haploxerolls, frequently flooded	15	Flooding >/= rare	1.00	Flooding >/= rare Saturated from 2.5 to 6.0'	1.00 0.98	Flooding >/= rare	1.00
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated		Not rated	

Table 8a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
132:							
Toags	50	No limitations		No limitations		No limitations	
Oxyaquic Haploxerolls, rarely flooded	20	Flooding >/= rare	1.00	Flooding >/= rare	1.00	Flooding >/= rare	1.00
				Saturated from 2.5 to 6.0'	0.98		
Riverwash	15	Flooding >/= rare	1.00	Flooding >/= rare	1.00	Flooding >/= rare	1.00
		Saturated within 18"	1.00	Saturated within 2.5'	1.00	Saturated within 18"	1.00
133:							
Toags	50	No limitations		No limitations		Slopes 4 to 8 percent	0.02
Pinncamp	30	No limitations		No limitations		Slopes 4 to 8 percent	0.02
134:							
Toags	70	No limitations		No limitations		Slopes 4 to 8 percent	0.02
135:							
Toags	50	No limitations		No limitations		Slopes 4 to 8 percent	0.02
Riverwash	35	Flooding >/= rare	1.00	Flooding >/= rare	1.00	Flooding >/= rare	1.00
		Saturated within 18"	1.00	Saturated within 2.5'	1.00	Saturated within 18"	1.00
136:							
Oxyaquic Haploxerolls, ponded	90	Ponded (any duration)	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Saturated within 18"	1.00	Saturated within 2.5'	1.00	Saturated within 18"	1.00
		Shrink-swell (LEP 3 to 6)	0.50	Shrink-swell (LEP 3 to 6)	0.50	Shrink-swell (LEP 3 to 6)	0.50
138:							
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated		Not rated	
Highpeaks	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
Chalone	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at 20 to 40"	0.90	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.90
		Shrink-swell (LEP 3 to 6)	0.01			Shrink-swell (LEP 3 to 6)	0.01
139:							
Highpeaks	75	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
Rock outcrop, rhyolitic breccia	15	Not rated		Not rated		Not rated	
142:							
Ordeal	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
				Bedrock (soft) at 20 to 40"	0.05		
Longsfolly	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00

Table 8a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
142:							
Passion	15	Bedrock (soft) at <20"	1.00	Bedrock (soft) at <20"	1.00	Bedrock (soft) at <20"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
146:							
Badlands, scarps in conglomerate	90	Not rated		Not rated		Not rated	
148:							
Backdoor	55	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
Tuborcio	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
152:							
Backdoor	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
155:							
Chalone	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at 20 to 40"	0.95	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.95
		Shrink-swell (LEP 3 to 6)	0.01			Shrink-swell (LEP 3 to 6)	0.01
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
Rock outcrop, rhyolite	15	Not rated		Not rated		Not rated	
156:							
Chalone	45	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at 20 to 40"	0.02	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.02
		Shrink-swell (LEP 3 to 6)	0.01			Shrink-swell (LEP 3 to 6)	0.01
Knuckle	25	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00	Bedrock (hard) at <20"	1.00
		Fragments (>3") 25 to 50 percent	0.05	Fragments (>3") 25 to 50 percent	0.05	Fragments (>3") 25 to 50 percent	0.05
Firstsister	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
PgE:							
Pinnacles	85	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Slopes >8 percent	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00	Shrink-swell (LEP >6)	1.00
				Bedrock (soft) at 20 to 40"	0.46		
PhG2:							
Pinnacles	45	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
				Bedrock (soft) at 20 to 40"	0.46		
PnE2:							
Pinnacles	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
				Bedrock (soft) at 20 to 40"	0.84		

Table 8a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
PnG3:							
Pinnacles---------------	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
				Bedrock (soft) at 20 to 40"	0.84		
SdG3:							
Santa Lucia-------------	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Bedrock (hard) at 20 to 40"	0.42	Bedrock (hard) at <40"	1.00	Bedrock (hard) at 20 to 40"	0.42

The interpretations for dwellings without basements evaluate the following soil properties, some at varying depths in the soil: Flooding, ponding, wetness, slope, subsidence of organic soils, shrink-swell expressed as linear extensibility percent (LEP), organic Unified classes for low soil strength (PT, OL or OH), depth to hard or soft bedrock, depth to a thick or thin cemented pan, and fragments greater than 3 inches in diameter.

The interpretations for dwellings with basements evaluate the following soil properties, some at varying depths in the soil: Flooding, ponding, wetness, slope, subsidence of organic soils, shrink-swell potential expressed as linear extensibility percent (LEP), organic Unified classes for low strength (PT, OL, OH), depth to hard or soft bedrock, depth to a thick or thin cemented pan, and fragments greater than 3 inches in diameter.

The interpretations for small commercial buildings evaluate the following soil properties, some at varying depths in the soil: Flooding, ponding, wetness, slope, subsidence of organic soils, shrink-swell potential expressed as linear extensibility percent (LEP), depth to hard or soft bedrock, depth to a thick or thin cemented pan, and fragments greater than 3 inches in diameter.

Table 8b.--Building Site Development (Part 2)

(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. The rating is based on the limitation with the highest value. Only the three limitations with the highest value are listed. There may be more limitations. Fine-earth fraction and coarse fragments are given on a weight basis. A brief summary of the rating criteria and a definition of some of the abbreviations are given at the end of the table)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations	
		Limitations	Value	Limitations	Value
101:					
Ordeal	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
				Bedrock (soft) at 20 to 40"	0.05
Passion	30	Slopes >15 percent	1.00	Bedrock (soft) at <20"	1.00
		Bedrock (soft) at <20"	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
Badlands	10	Not rated		Not rated	
104:					
Knuckle	35	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
Burgundy	25	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
Argixerolls	15	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at 20 to 40"	0.74	Slopes >15 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.01	Caving potential	1.00
105:					
Chalone	35	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at <20"	0.99	Slopes >15 percent	1.00
				Caving potential	1.00
Firstsister	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
Highpeaks	20	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
106:					
Casino	50	AASHTO GI >8 (low soil strength)	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP >6)	1.00	Clay content 40 to 60 percent	0.31
Argixerolls	30	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.50	Low caving potential	0.10

Table 8b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations	
		Limitations	Value	Limitations	Value
107:					
Casino	70	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Shrink-swell (LEP >6)	1.00	Slopes >15 percent	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	1.00
109:					
Rock outcrop, pinnacles of rhyolitic breccia	35	Not rated		Not rated	
Highpeaks	35	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
Burgundy	20	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
110:					
Knuckle	35	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
Chalone	30	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at 20 to 40"	0.71	Slopes >15 percent	1.00
				Caving potential	1.00
Burgundy	20	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
111:					
Backdoor sandy loam	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
Backdoor gravelly sandy loam	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
Tuborcio	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.50	Caving potential	1.00
				Clay content 40 to 60 percent	0.12
112:					
Rimtrail	85	AASHTO GI 5-8 (soil strength)	0.78	Low caving potential	0.10
113:					
Elder	40	Flooding >/= occasional	1.00	Caving potential	1.00
				Frequent or occasional flooding	0.50
Oxyaquic Haploxerolls, rarely flooded	40	Rare flooding	0.50	Caving potential	1.00
				Saturated from 2.5 to 6'	0.98

Table 8b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations	
		Limitations	Value	Limitations	Value
114:					
Ordeal	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
				Bedrock (soft) at 20 to 40"	0.50
Tuborcio	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP >6)	1.00	Clay content 40 to 60 percent	0.12
		AASHTO GI >8 (low soil strength)	1.00	Low caving potential	0.10
Passion	15	Slopes >15 percent	1.00	Bedrock (soft) at <20"	1.00
		Bedrock (soft) at <20"	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
115:					
Tuborcio	80	Shrink-swell (LEP >6)	1.00	Slopes 8 to 15 percent	0.37
		AASHTO GI >8 (low soil strength)	1.00	Clay content 40 to 60 percent	0.12
		Slopes 8 to 15 percent	0.37	Low caving potential	0.10
117:					
Elder	80	No limitations		Caving potential	1.00
119:					
Still	80	AASHTO GI >8 (low soil strength)	1.00	Low caving potential	0.10
		Shrink-swell (LEP 3 to 6)	0.50		
120:					
Elder	80	No limitations		Caving potential	1.00
122:					
Tuborcio	80	AASHTO GI >8 (low soil strength)	1.00	Slopes >15 percent	1.00
		Slopes >15 percent	1.00	Clay content 40 to 60 percent	0.12
		Shrink-swell (LEP >6)	1.00	Low caving potential	0.10
123:					
Teapot	60	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated	
127:					
Argixerolls	50	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at 20 to 40"	0.64	Slopes >15 percent	1.00
				Caving potential	1.00
Rock outcrop, rhyolite	20	Not rated		Not rated	
Chalone	15	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at <20"	0.99	Slopes >15 percent	1.00
		Fragments (>3") 25 to 50 percent	0.39	Caving potential	1.00

Table 8b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations	
		Limitations	Value	Limitations	Value
128:					
Still	70	No limitations		Caving potential	1.00
Riverwash	20	Saturated within 12"	1.00	Saturated within 2.5'	1.00
		Flooding >/= occasional	1.00	Frequent or occasional flooding	0.50
				Low caving potential	0.10
131:					
Firstsister	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Fragments (>3") 25 to 50 percent	0.59	Fragments (>3") 25 to 50 percent	0.59
				Low caving potential	0.10
Oxyaquic Haploxerolls, frequently flooded	15	Flooding >/= occasional	1.00	Caving potential	1.00
				Saturated from 2.5 to 6'	0.98
				Frequent or occasional flooding	0.50
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated	
132:					
Toags	50	No limitations		Caving potential	1.00
Oxyaquic Haploxerolls, rarely flooded	20	Rare flooding	0.50	Caving potential	1.00
				Saturated from 2.5 to 6'	0.98
Riverwash	15	Saturated within 12"	1.00	Saturated within 2.5'	1.00
		Flooding >/= occasional	1.00	Frequent or occasional flooding	0.50
				Low caving potential	0.10
133:					
Toags	50	No limitations		Caving potential	1.00
Pinncamp	30	No limitations		Caving potential	1.00
134:					
Toags	70	No limitations		Caving potential	1.00
135:					
Toags	50	No limitations		Caving potential	1.00
Riverwash	35	Saturated within 12"	1.00	Saturated within 2.5'	1.00
		Flooding >/= occasional	1.00	Frequent or occasional flooding	0.50
				Low caving potential	0.10
136:					
Oxyaquic Haploxerolls, ponded	90	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Saturated within 12"	1.00	Saturated within 2.5'	1.00
		Shrink-swell (LEP 3 to 6)	0.50	Caving potential	1.00
138:					
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated	

Table 8b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations	
		Limitations	Value	Limitations	Value
138:					
Highpeaks-------------------------	30	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
Chalone---------------------------	15	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at 20 to 40"	0.90	Slopes >15 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.01	Caving potential	1.00
139:					
Highpeaks-------------------------	75	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10
Rock outcrop, rhyolitic breccia---	15	Not rated		Not rated	
142:					
Ordeal----------------------------	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
				Bedrock (soft) at 20 to 40"	0.05
Longsfolly------------------------	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
Passion---------------------------	15	Bedrock (soft) at <20"	1.00	Bedrock (soft) at <20"	1.00
		Slopes >15 percent	1.00	Caving potential	1.00
				Slopes >15 percent	1.00
146:					
Badlands, scarps in conglomerate--	90	Not rated		Not rated	
148:					
Backdoor--------------------------	55	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
Tuborcio--------------------------	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP >6)	1.00	Clay content 40 to 60 percent	0.12
		AASHTO GI >8 (low soil strength)	1.00	Low caving potential	0.10
152:					
Backdoor--------------------------	85	Slopes >15 percent	1.00	Caving potential	1.00
				Slopes >15 percent	1.00
155:					
Chalone---------------------------	40	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at 20 to 40"	0.95	Slopes >15 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.01	Caving potential	1.00
Knuckle---------------------------	35	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Low caving potential	0.10

Table 8b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
155:					
Rock outcrop, rhyolite	15	Not rated		Not rated	
156:					
Chalone	45	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Bedrock (hard) at 20 to 40"	0.02	Slopes >15 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.01	Caving potential	1.00
Knuckle	25	Bedrock (hard) at <20"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Fragments (>3") 25 to 50 percent	0.05	Low caving potential	0.10
Firstsister	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Caving potential	1.00
PgE:					
Pinnacles	85	Shrink-swell (LEP >6)	1.00	Caving potential	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00
		AASHTO GI 5-8 (soil strength)	0.22	Bedrock (soft) at 20 to 40"	0.46
PhG2:					
Pinnacles	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP >6)	1.00	Caving potential	1.00
		AASHTO GI 5-8 (soil strength)	0.22	Bedrock (soft) at 20 to 40"	0.46
PnE2:					
Pinnacles	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP >6)	1.00	Bedrock (soft) at 20 to 40"	0.84
		AASHTO GI >8 (low soil strength)	1.00	Clay content 40 to 60 percent	0.12
PnG3:					
Pinnacles	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Shrink-swell (LEP >6)	1.00	Bedrock (soft) at 20 to 40"	0.84
		AASHTO GI >8 (low soil strength)	1.00	Clay content 40 to 60 percent	0.12
SdG3:					
Santa Lucia	85	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		AASHTO GI >8 (low soil strength)	1.00	Slopes >15 percent	1.00
		Bedrock (hard) at 20 to 40"	0.42	Low caving potential	0.10

The interpretations for local roads and streets evaluate the following soil properties at varying depths in the soil: Flooding, ponding, wetness, slope, organic Unified classes for low soil strength (PT, OL or OH), amount of clay, depth to hard or soft bedrock, depth to a thick or thin cemented pan, fragments greater than 3 inches in diameter, soil bulk density, and the potential of the soil to cave in.

The interpretations for shallow excavation evaluate the following soil properties at varying depths in the soil: Flooding, ponding, wetness, slope, subsidence of organic soils, shrink-swell potential expressed as linear extensibility percent (LEP), potential frost action, depth to hard or soft bedrock, depth to a thick or thin cemented pan, fragments greater than 3 inches in diameter, and soil strength expressed as the AASHTO group index number (AASHTO GI).

Table 9a.--Sanitary Facilities (Part 1)

(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. The rating is based on the limitation with the highest value. Only the three limitations with the highest value are listed. There may be more limitations. Fine-earth fraction and coarse fragment content are given on a weight basis. A brief summary of the rating criteria is given at the end of the table)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Limitations	Value	Limitations	Value
101:					
Ordeal	50	Slopes >15 percent	1.00	Bedrock (soft) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
				Permeability >2"/hr (seepage)	1.00
Passion	30	Depth to bedrock <40"	1.00	Bedrock (soft) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability >2"/hr (seepage)	1.00
Badlands	10	Not rated		Not rated	
104:					
Knuckle	35	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability >2"/hr (seepage)	1.00
Burgundy	25	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Argixerolls	15	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00		
105:					
Chalone	35	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
Firstsister	35	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Seepage in bottom layer	1.00	Permeability >2"/hr (seepage)	1.00
Highpeaks	20	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
106:					
Casino	50	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Depth to bedrock <40"	1.00		

Table 9a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
106:					
Argixerolls	30	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
107:					
Casino	70	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Bedrock (hard) at <40"	1.00
				Slopes >8 percent	1.00
		Slopes >15 percent	1.00		
		Depth to bedrock <40"	1.00		
109:					
Rock outcrop, pinnacles of rhyolitic breccia	35	Not rated		Not rated	
Highpeaks	35	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
Burgundy	20	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
110:					
Knuckle	35	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability >2"/hr (seepage)	1.00
Chalone	30	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
				Permeability 0.6-2.0"/hr (some seepage)	0.53
Burgundy	20	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
111:					
Backdoor sandy loam	35	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Seepage in bottom layer	1.00	Permeability >2"/hr (seepage)	1.00
		Permeability 0.6-2.0"/hr (slow percolation)	0.46		
Backdoor gravelly sandy loam	30	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Seepage in bottom layer	1.00	Permeability >2"/hr (seepage)	1.00
		Permeability 0.6-2.0"/hr (slow percolation)	0.46		

Table 9a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Limitations	Value	Limitations	Value
111:					
Tuborcio	20	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Slopes >8 percent	1.00
		Slopes >15 percent	1.00	Permeability >2"/hr (seepage)	1.00
112:					
Rimtrail	85	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
				Slopes 2 to 8 percent	0.17
113:					
Elder	40	Flooding	1.00	Flooding >/= occasional	1.00
		Seepage in bottom layer	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 8 percent	0.33
Oxyaquic Haploxerolls, rarely flooded	40	Saturated within 4'	1.00	Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00	Rare flooding	0.50
		Rare flooding	0.40	Saturated from 3.5 to 5'	0.48
114:					
Ordeal	40	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Bedrock (soft) at <40"	1.00
				Slopes >8 percent	1.00
		Slopes >15 percent	1.00	Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00		
Tuborcio	35	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Slopes >8 percent	1.00
				Permeability 0.6-2.0"/hr (some seepage)	0.53
		Slopes >15 percent	1.00		
Passion	15	Depth to bedrock <40"	1.00	Bedrock (soft) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability >2"/hr (seepage)	1.00
115:					
Tuborcio	80	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Slopes >8 percent	1.00
				Permeability 0.6-2.0"/hr (some seepage)	0.53
		Slopes 8 to 15 percent	0.37		
117:					
Elder	80	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00		
119:					
Still	80	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
120:					
Elder	80	Permeability 0.6-2.0"/hr (slow percolation)	0.46	Permeability >2"/hr (seepage)	1.00

Table 9a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
122:					
Tuborcio	80	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Slopes >8 percent	1.00
		Slopes >15 percent	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
123:					
Teapot	60	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Permeability 0.6-2.0"/hr (slow percolation)	0.46	Permeability 0.6-2.0"/hr (some seepage)	0.53
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated	
127:					
Argixerolls	50	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Permeability 0.6-2.0"/hr (slow percolation)	0.46	Permeability 0.6-2.0"/hr (some seepage)	0.53
Rock outcrop, rhyolite	20	Not rated		Not rated	
Chalone	15	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Fragments (>3") >35 percent	1.00
128:					
Still	70	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
Riverwash	20	Flooding	1.00	Flooding >/= occasional	1.00
		Saturated within 4'	1.00	Saturated within 3.5'	1.00
131:					
Firstsister	50	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Fragments (>3") 25 to 50 percent	0.59	Fragments (>3") >35 percent	1.00
		Permeability 0.6-2.0"/hr (slow percolation)	0.46	Permeability 0.6-2.0"/hr (some seepage)	0.53
Oxyaquic Haploxerolls, frequently flooded	15	Flooding	1.00	Flooding >/= occasional	1.00
		Saturated within 4'	1.00	Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00		
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated	
132:					
Toags	50	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00		

Table 9a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
132:					
Oxyaquic Haploxerolls, rarely flooded	20	Saturated within 4'	1.00	Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00	Rare flooding	0.50
		Rare flooding	0.40		
Riverwash	15	Flooding	1.00	Flooding >/= occasional	1.00
		Saturated within 4'	1.00	Saturated within 3.5'	1.00
133:					
Toags	50	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 8 percent	0.33
		Seepage in bottom layer	1.00		
Pinncamp	30	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 8 percent	0.33
		Seepage in bottom layer	1.00		
134:					
Toags	70	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 8 percent	0.67
		Seepage in bottom layer	1.00		
135:					
Toags	50	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 8 percent	0.67
		Seepage in bottom layer	1.00		
Riverwash	35	Flooding	1.00	Flooding >/= occasional	1.00
		Saturated within 4'	1.00	Saturated within 3.5'	1.00
136:					
Oxyaquic Haploxerolls, ponded	90	Ponded (any duration)	1.00	Saturated within 3.5'	1.00
		Saturated within 4'	1.00	Ponded (any duration)	1.00
		Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
138:					
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated	
Highpeaks	30	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
Chalone	15	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
		Permeability 0.6-2.0"/hr (slow percolation)	0.46	Permeability 0.6-2.0"/hr (some seepage)	0.53

Table 9a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
139:					
Highpeaks	75	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
Rock outcrop, rhyolitic breccia	15	Not rated		Not rated	
142:					
Ordeal	40	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Bedrock (soft) at <40"	1.00
				Slopes >8 percent	1.00
		Slopes >15 percent	1.00	Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00		
Longsfolly	35	Permeability >6"/hr between 24 and 60" (seepage and poor filter)	1.00	Slopes >8 percent	1.00
				Permeability >2"/hr (seepage)	1.00
		Slopes >15 percent	1.00	Bedrock (soft) at <40"	0.99
		Seepage in bottom layer	1.00		
Passion	15	Depth to bedrock <40"	1.00	Bedrock (soft) at <40"	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Slopes >8 percent	1.00
				Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00		
146:					
Badlands, scarps in conglomerate	90	Not rated		Not rated	
148:					
Backdoor	55	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Seepage in bottom layer	1.00	Permeability >2"/hr (seepage)	1.00
		Permeability 0.6-2.0"/hr (slow percolation)	0.46		
Tuborcio	30	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Slopes >8 percent	1.00
				Permeability 0.6-2.0"/hr (some seepage)	0.53
		Slopes >15 percent	1.00		
152:					
Backdoor	85	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Slopes >8 percent	1.00
				Permeability >2"/hr (seepage)	1.00
		Seepage in bottom layer	1.00		
		Slopes >15 percent	1.00		
155:					
Chalone	40	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability >2"/hr (seepage)	1.00
Knuckle	35	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00		

Table 9a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Limitations	Value	Limitations	Value
155:					
Rock outcrop, rhyolite	15	Not rated		Not rated	
156:					
Chalone	45	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
				Permeability 0.6-2.0"/hr (some seepage)	0.53
Knuckle	25	Depth to bedrock <40"	1.00	Bedrock (hard) at <40"	1.00
		Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Firstsister	15	Slopes >15 percent	1.00	Slopes >8 percent	1.00
		Seepage in bottom layer	1.00	Permeability >2"/hr (seepage)	1.00
PgE:					
Pinnacles	85	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Bedrock (soft) at <40"	1.00
				Slopes >8 percent	1.00
		Depth to bedrock <40"	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
		Slopes >15 percent	1.00		
PhG2:					
Pinnacles	50	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Bedrock (soft) at <40"	1.00
				Slopes >8 percent	1.00
		Slopes >15 percent	1.00	Permeability 0.6-2.0"/hr (some seepage)	0.53
		Depth to bedrock <40"	1.00		
PnE2:					
Pinnacles	85	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Bedrock (soft) at <40"	1.00
				Slopes >8 percent	1.00
		Slopes >15 percent	1.00		
		Depth to bedrock <40"	1.00		
PnG3:					
Pinnacles	85	Permeability <0.6"/hr between 24 and 60" (slow percolation)	1.00	Bedrock (soft) at <40"	1.00
				Slopes >8 percent	1.00
		Slopes >15 percent	1.00		
		Depth to bedrock <40"	1.00		
SdG3:					
Santa Lucia	85	Slopes >15 percent	1.00	Bedrock (hard) at <40"	1.00
		Depth to bedrock <40"	1.00	Slopes >8 percent	1.00
				Permeability 0.6-2.0"/hr (some seepage)	0.53

The interpretations for septic tanks adsorption fields evaluate the following soil properties at varying depths in the soil: Flooding; ponding; wetness; slope; subsidence of organic soils; depth to hard or soft bedrock; depth to a cemented pan; permeability that is too fast, resulting in seepage; and permeability that is too slow or impermeable layer at a shallow depth.

The interpretations for sewage lagoons evaluate the following soil properties at varying depths in the soil: Flooding, ponding, wetness, slope, organic Unified classes for low strength (PT, OL, OH), depth to hard or soft bedrock, depth to a cemented pan, fragments greater than 3 inches in diameter, and permeability that is too fast, resulting in seepage.

Table 9b.--Sanitary Facilities (Part 2)

(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. The rating is based on the limitation with the highest value. Only the three limitations that have the highest value are listed. There may be more limitations. Fine-earth fraction and coarse fragment content are given on a weight basis. A brief summary of the rating criteria is given at the end of the table. For an explanation of the texture abbreviations, see "Texture, soil" in the Glossary)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
101:							
Ordeal	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Seepage at 20 to 40"	1.00	Slopes >15 percent	1.00
				Depth to bedrock <40"	1.00	Permeability >2.0 in/hr	1.00
		Sandy textures (cosl, ls, lfs, or lvfs)	0.50				
Passion	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Seepage at 20 to 40"	1.00	Slopes >15 percent	1.00
				Depth to bedrock <40"	1.00	Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00				
Badlands		Not rated		Not rated		Not rated	
104:							
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Depth to bedrock <40"	1.00
						Slopes >15 percent	1.00
		Seepage in bottom layer	1.00				
Burgundy	25	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <10"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
Argixerolls	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Fragments (3-10") 15 to 35 percent	0.04				
105:							
Chalone	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Depth to bedrock <40"	1.00
						Slopes >15 percent	1.00
Firstsister	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
		Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Slopes >15 percent	1.00
		Fragments (3-10") 15 to 35 percent	0.02			Permeability >2.0 in/hr	0.52
Highpeaks	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Fragments (<75mm) 25 to 50 percent	0.98

Table 9b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Limitations	Value	Area sanitary landfill: Limitations	Value	Daily cover for landfill: Limitations	Value
106:							
Casino	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Clay or silty clay	1.00			Silty clay or clay at depth of 10 to 60"	1.00
Argixerolls	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Depth to bedrock <40"	1.00
		Clay loam, silty clay, silty clay loam	0.50			Slopes >15 percent	1.00
107:							
Casino	70	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Clay or silty clay	1.00			Silty clay or clay at depth of 10 to 60"	1.00
109:							
Rock outcrop, pinnacles of rhyolitic breccia	35	Not rated		Not rated		Not rated	
Highpeaks	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Fragments (3-10") 15 to 35 percent	0.01			Fragments (<75mm) 25 to 50 percent	0.66
Burgundy	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <10"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
110:							
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Seepage in bottom layer	1.00			Permeability >2.0 in/hr	1.00
Chalone	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Depth to bedrock <40"	1.00
						Slopes >15 percent	1.00
Burgundy	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <10"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
111:							
Backdoor sandy loam	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Sandy texture (cosl, ls, lfs, or lvfs)	0.50			Lcos, ls, lfs, or vfs texture	0.50

Table 9b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
111:							
Backdoor gravelly sandy loam------------------	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Sandy texture (cosl, ls, lfs, or lvfs)	0.50			Lcos, ls, lfs, or vfs texture	0.50
Tuborcio----------------	20	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
				Seepage at 20 to 40"	1.00	Fragments (<75mm) 25 to 50 percent	0.11
112:							
Rimtrail----------------	85	No limitations		No limitations		No limitations	
113:							
Elder-------------------	40	Flooding >/=occasional	1.00	Seepage at 20 to 40"	1.00	Fragments (<75mm) >50 percent	1.00
		Seepage in bottom layer	1.00	Occasional flooding	0.60	Permeability >2.0 in/hr	0.52
Oxyaquic Haploxerolls, rarely flooded---------	40	Saturated within 6'	1.00	Saturated within 5'	1.00	Permeability >2.0 in/hr	0.52
		Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Fragments (<75mm) 25 to 50 percent	0.29
		Rare flooding	0.50	Rare flooding	0.40		
						Saturated from 18 to 40"	0.22
114:							
Ordeal------------------	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Seepage at 20 to 40"	1.00	Slopes >15 percent	1.00
				Depth to bedrock <40"	1.00	Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00				
Tuborcio----------------	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
Passion-----------------	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00				
115:							
Tuborcio----------------	80	Clay or silty clay	1.00	Slopes 8 to 15 percent	0.37	Silty clay or clay at depth of 10 to 60"	1.00
		Slopes 8 to 15 percent	0.37			Hard to pack	1.00
117:							
Elder-------------------	80	Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Sandy texture (cosl, ls, lfs, or lvfs)	0.50			Lcos, ls, lfs, or vfs texture	0.50
						Fragments (<75mm) 25 to 50 percent	0.01
119:							
Still-------------------	80	No limitations		No limitations		No limitations	

Table 9b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
120:							
Elder-------------------	80	Sandy texture (cosl, ls, lfs, or lvfs)	0.50	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
						Lcos, ls, lfs, or vfs texture	0.50
122:							
Tuborcio----------------	80	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Clay loam, silty clay, silty clay loam	0.50			Hard to pack	1.00
						Silt or clay at depth of 10 to 60"	0.50
123:							
Teapot------------------	60	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
						Slopes >15 percent	1.00
Rock outcrop, diatomaceous mudstone--	30	Not rated		Not rated		Not rated	
127:							
Argixerolls-------------	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <31"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
Rock outcrop, rhyolite--	20	Not rated		Not rated		Not rated	
Chalone-----------------	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Fragments (>3") 25 to 50 percent	0.39
		Fragments (3-10") >35 percent	1.00				
128:							
Still-------------------	70	Clay loam, silty clay, silty clay loam	0.50	No limitations		Silt or clay from 10 to 60"	0.50
						Clay loam, silty clay, silty clay loam	0.50
Riverwash---------------	20	Not rated		Not rated		Not rated	
131:							
Firstsister-------------	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Fragments (3-10") 15 to 35 percent	0.59			Fragments (<75mm) 25 to 50 percent	0.97
						Fragments (>3") 25 to 50 percent	0.65
Oxyaquic Haploxerolls, frequently flooded-----	15	Flooding >/=occasional	1.00	Saturated within 5'	1.00	Permeability >2.0 in/hr	1.00
		Saturated within 6'	1.00	Seepage at 20 to 40"	1.00	Lcos, ls, lfs, or vfs texture	0.50
		Seepage in bottom layer	1.00	Frequent flooding	0.80	Saturated from 18 to 40"	0.22
Rock outcrop, rhyolite or breccia-------------	15	Not rated		Not rated		Not rated	

Table 9b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
132:							
Toags	50	Sandy texture (cos, s, fs, lcos, or vfs)	1.00	Seepage at 20 to 40"	1.00	S, fs, cos, or sg texture	1.00
						Permeability >2.0 in/hr	1.00
						Fragments (<75mm) 25 to 50 percent	0.41
Oxyaquic Haploxerolls, rarely flooded	20	Saturated within 6'	1.00	Saturated within 5'	1.00	S, fs, cos, or sg texture	1.00
		Sandy texture (cos, s, fs, lcos, or vfs)	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
				Rare flooding	0.40	Saturated from 18 to 40"	0.22
		Seepage in bottom layer	1.00				
Riverwash	15	Not rated		Not rated		Not rated	
133:							
Toags	50	Sandy texture (cos, s, fs, lcos, or vfs)	1.00	Seepage at 20 to 40"	1.00	S, fs, cos, or sg texture	1.00
						Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00			Fragments (<75mm) 25 to 50 percent	0.05
Pinncamp	30	Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Sandy texture (cosl, ls, lfs, or lvfs)	0.50			Lcos, ls, lfs, or vfs texture	0.50
134:							
Toags	70	Sandy texture (cos, s, fs, lcos, or vfs)	1.00	Seepage at 20 to 40"	1.00	S, fs, cos, or sg texture	1.00
						Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00			Fragments (<75mm) 25 to 50 percent	0.39
135:							
Toags	50	Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Sandy texture (cosl, ls, lfs, or lvfs)	0.50			Lcos, ls, lfs, or vfs texture	0.50
						Fragments (<75mm) 25 to 50 percent	0.05
Riverwash	35	Not rated		Not rated		Not rated	
136:							
Oxyaquic Haploxerolls, ponded	90	Saturated within 6'	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Ponded (any duration)	1.00	Saturated within 5'	1.00	Saturated within 18"	1.00
138:							
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated		Not rated	
Highpeaks	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Fragments (3-10") 15 to 35 percent	0.11			Fragments (<75mm) 25 to 50 percent	0.93

Table 9b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
138:							
Chalone-----------------	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Fragments (3-10") 15 to 35 percent	0.01			Fragments (<75mm) 25 to 50 percent	0.96
139:							
Highpeaks---------------	75	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Fragments (<75mm) 25 to 50 percent	0.95
Rock outcrop, rhyolitic breccia----------------	15	Not rated		Not rated		Not rated	
142:							
Ordeal------------------	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Seepage at 20 to 40"	1.00	Slopes >15 percent	1.00
		Seepage in bottom layer	1.00	Depth to bedrock <40"	1.00	Permeability >2.0 in/hr	1.00
Longsfolly--------------	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Lithic or paralithic bedrock at <72"	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00	Depth to bedrock <40"	1.00	Depth to bedrock <40"	1.00
Passion-----------------	15	Lithic or paralithic bedrock at <72"	1.00	Seepage at 20 to 40"	1.00	Depth to bedrock <40"	1.00
				Depth to bedrock <40"	1.00	Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Slopes >15 percent	1.00				
146:							
Badlands, scarps in conglomerate-----------	90	Not rated		Not rated		Not rated	
148:							
Backdoor----------------	55	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Sandy texture (cosl, ls, lfs, or lvfs)	0.50			Lcos, ls, lfs, or vfs texture	0.50
Tuborcio----------------	30	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Clay loam, silty clay, silty clay loam	0.50			Hard to pack	1.00
						Silt or clay from 10 to 60"	0.50
152:							
Backdoor----------------	85	Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Permeability >2.0 in/hr	1.00
		Slopes >15 percent	1.00	Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Sandy texture (cosl, ls, lfs, or lvfs)	0.50			Lcos, ls, lfs, or vfs texture	0.50

Table 9b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
155:							
Chalone	40	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Seepage at 20 to 40"	1.00	Slopes >15 percent	1.00
				Depth to bedrock <40"	1.00	Fragments (<75mm) 25 to 50 percent	0.99
Knuckle	35	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <10"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
		Seepage in bottom layer	1.00				
Rock outcrop, rhyolite	15	Not rated		Not rated		Not rated	
156:							
Chalone	45	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Depth to bedrock <40"	1.00
						Slopes >15 percent	1.00
Knuckle	25	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Permeability >2.0 in/hr	1.00
		Seepage in bottom layer	1.00				
Firstsister	15	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Fragments (<75mm) >50 percent	1.00
		Seepage in bottom layer	1.00	Seepage at 20 to 40"	1.00	Slopes >15 percent	1.00
						Permeability >2.0 in/hr	0.52
PgE:							
Pinnacles	85	Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Depth to bedrock <40"	1.00
				Slopes >15 percent	1.00	Slopes >15 percent	1.00
		Slopes >15 percent	1.00			Silty clay or clay 10 to 60"	1.00
		Clay or silty clay	1.00				
PhG2:							
Pinnacles	50	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Silty clay or clay 10 to 60"	1.00
		Clay or silty clay	1.00				
PnE2:							
Pinnacles	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Hard to pack	1.00
		Clay loam, silty clay, silty clay loam	0.50				
PnG3:							
Pinnacles	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00
						Hard to pack	1.00
		Clay loam, silty clay, silty clay loam	0.50				

Table 9b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
SdG3:							
Santa Lucia-------------	85	Slopes >15 percent	1.00	Slopes >15 percent	1.00	Depth to bedrock <40"	1.00
		Lithic or paralithic bedrock at <72"	1.00	Depth to bedrock <40"	1.00	Slopes >15 percent	1.00

The interpretations for trench sanitary landfills evaluate the following soil properties at varying depths in the soil: Flooding, ponding, wetness, slope, depth to hard or soft bedrock, depth to a thick or thin cemented pan, fragments 3 to 10 inches in diameter, sodium content (SAR), soil pH, clayey or sandy textures, and permeability that is too high, resulting in seepage in some climates.

The interpretations for area sanitary landfills evaluate the following soil properties at varying depths in the soil: Flooding, ponding, wetness, slope, depth to bedrock, depth to a cemented pan, and permeability that is too high, resulting in seepage in some climates.

The interpretations for daily cover for landfill evaluate the following soil properties at varying depths in the soil: Ponding, wetness, slope, depth to bedrock, depth to a cemented pan, fragments greater than or less than 3 inches in diameter, Unified class for peat (PT), Unified classes for packing (OL, OH, CH, MH), sandy or clayey textures, soil pH, carbonates, sodium content (SAR), salinity (EC), soil climate, kaolinitic mineralogy, and permeability that is too high, resulting in seepage.

Table 10a.--Construction Materials (Part 1)

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The closer the value is to 0, the greater the potential limitation. Values of 0 are absolute limitations. Values closer to 1.0 have less of a limitation. Values of 1.00 have absolutely no limitation. Rating classes are determined by the most limiting value. Fine-earth fraction and fragment content are given on a weight basis. A brief summary of the rating criteria and a definition of some of the abbreviations are at the end of the table)

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
101:							
Ordeal	50	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Sand fraction 75 to 85 percent	0.38
						Depth to bedrock 20 to 40"	0.84
Passion	30	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.14	Rock fragment content	0.00
						Depth to bedrock <20"	0.00
						Sand fraction 75 to 85 percent	0.01
Badlands	10	Not rated		Not rated		Not rated	
104:							
Knuckle	35	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.08	Rock fragment content	0.00
						Depth to bedrock <20"	0.00
						Sand fraction 75 to 85 percent	0.15
Burgundy	25	Fair		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
				Bottom layer possible source	0.03	Rock fragment content	0.00
		Bottom layer possible source	0.38			Depth to bedrock <20"	0.00
Argixerolls	15	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.36
						pH 4.5 to 6.5	0.98
105:							
Chalone	35	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.05	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.02

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
105:							
Firstsister	35	Fair		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.02	Slope >15 percent	0.00
				Thickest layer possible source	0.03	Rock fragment content	0.00
		Bottom layer possible source	0.25			Hard to reclaim	0.00
Highpeaks	20	Poor		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
				Bottom layer possible source	0.03	Rock fragment content	0.00
		Bottom layer not a source	0.00			Depth to bedrock <20"	0.00
106:							
Casino	50	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
						Depth to bedrock 20 to 40"	0.86
Argixerolls	30	Fair		Poor		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
				Thickest layer not a source	0.00	Depth to bedrock <20"	0.00
		Bottom layer possible source	0.80			Rock fragment content	0.00
107:							
Casino	70	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
						Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.60
109:							
Rock outcrop, pinnacles of rhyolitic breccia	35	Not rated		Not rated		Not rated	
Highpeaks	35	Poor		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
				Bottom layer possible source	0.03	Depth to bedrock <20"	0.00
		Bottom layer not a source	0.00			Rock fragment content	0.00
Burgundy	20	Poor		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
				Bottom layer possible source	0.03	Rock fragment content	0.00
		Bottom layer not a source	0.00			Depth to bedrock <20"	0.00
110:							
Knuckle	35	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.10	Rock fragment content	0.00
						Depth to bedrock <20"	0.00
						Sand fraction 75 to 85 percent	0.01

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
110:							
Chalone-----------------	30	Fair		Poor		Poor	
		Thickest layer possible source	0.13	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Bottom layer possible source	0.65	Thickest layer not a source	0.00	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.38
Burgundy----------------	20	Fair		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Bottom layer possible source	0.38	Bottom layer possible source	0.03	Rock fragment content	0.00
						Depth to bedrock <20"	0.00
111:							
Backdoor sandy loam-----	35	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.11	Sand fraction 75 to 85 percent	0.22
						pH 4.5 to 6.5	0.98
Backdoor gravelly sandy loam-------------------	30	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.11	Rock fragment content	0.18
Tuborcio----------------	20	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
112:							
Rimtrail----------------	85	Poor		Poor		Fair	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay 27 to 40 percent	0.82
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00		
113:							
Elder-------------------	40	Fair		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.03	Hard to reclaim	0.00
		Bottom layer possible source	0.57	Bottom layer possible source	0.14	Rock fragment content	0.18
Oxyaquic Haploxerolls, rarely flooded---------	40	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Saturated from 1 to 3'	0.99

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
114:							
Ordeal	40	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Bottom layer possible source	0.12	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.12	Rock fragment content	0.00
						Sand fraction 75 to 85 percent	0.06
						Depth to bedrock 20 to 40"	0.50
						pH 4.5 to 6.5	0.88
Tuborcio	35	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
Passion	15	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.10	Depth to bedrock <20"	0.00
						Rock fragment content	0.08
						Sand fraction 75 to 85 percent	0.38
115:							
Tuborcio	80	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay >40 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope 8 to 12 percent	0.63
117:							
Elder	80	Poor		Fair		Fair	
		Bottom layer not a source	0.00	Thickest layer possible source	0.03	Hard to reclaim	0.26
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.14	Rock fragment content	0.82
119:							
Still	80	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay >40 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00		
120:							
Elder	80	Poor		Fair		Fair	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.24
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.04	Hard to reclaim	0.95
122:							
Tuborcio	80	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
						pH 4.5 to 6.5	0.95

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
123:							
Teapot	60	Fair		Poor		Poor	
		Bottom layer possible source	0.38	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer possible source	0.38	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00
						pH 4.5 to 6.5	0.50
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated		Not rated	
127:							
Argixerolls	50	Not rated		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
				Organic matter content	0.00	Depth to bedrock 20 to 40"	0.42
Rock outcrop, rhyolite	20	Not rated		Not rated		Not rated	
Chalone	15	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.04
						pH >6.5	1.00
128:							
Still	70	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.01		
Riverwash	20	Not rated		Not rated		Not rated	
131:							
Firstsister	50	Fair		Fair		Poor	
		Thickest layer possible source	0.20	Thickest layer not a source	0.00	Slope >15 percent	0.00
				Bottom layer possible source	0.03	Rock fragment content	0.00
		Bottom layer possible source	0.23			Hard to reclaim	0.00
Oxyaquic Haploxerolls, frequently flooded	15	Fair		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.03	Hard to reclaim	0.00
						Rock fragment content	0.88
		Bottom layer possible source	0.10	Bottom layer possible source	0.14	Saturated from 1 to 3'	0.99
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated		Not rated	
132:							
Toags	50	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Bottom layer possible source	0.12	Rock fragment content	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.16	Sand fraction 75 to 85 percent	0.01
						Hard to reclaim	0.68

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
132:							
Oxyaquic Haploxerolls, rarely flooded	20	Fair		Fair		Fair	
		Bottom layer not a source	0.00	Thickest layer possible source	0.10	Sand fraction 75 to 85 percent	0.32
		Thickest layer possible source	0.22	Bottom layer possible source	0.91	Saturated from 1 to 3'	0.99
Riverwash	15	Not rated		Not rated		Not rated	
133:							
Toags	50	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer possible source	0.23	Sand fraction >85 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00			Rock fragment content	0.01
				Bottom layer possible source	0.84	Hard to reclaim	0.95
Pinncamp	30	Poor		Fair		Fair	
		Bottom layer not a source	0.00	Thickest layer possible source	0.09	Sand fraction 75 to 85 percent	0.04
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.11	Rock fragment content	0.82
134:							
Toags	70	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Bottom layer possible source	0.12	Rock fragment content	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.12	Sand fraction 75 to 85 percent	0.38
						Hard to reclaim	0.61
135:							
Toags	50	Poor		Fair		Fair	
		Bottom layer not a source	0.00	Bottom layer possible source	0.07	Rock fragment content	0.01
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer possible source	0.09	Sand fraction 75 to 85 percent	0.38
						Hard to reclaim	0.95
Riverwash	35	Not rated		Not rated		Not rated	
136:							
Oxyaquic Haploxerolls, ponded	90	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Saturated within 1'	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
138:							
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated		Not rated	
Highpeaks	30	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Depth to bedrock <20"	0.00
						Rock fragment content	0.00

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
138:							
Chalone	15	Poor		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Bottom layer not a source	0.00	Bottom layer possible source	0.04	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.22
139:							
Highpeaks	75	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Depth to bedrock <20"	0.00
						Rock fragment content	0.00
Rock outcrop, rhyolitic breccia	15	Not rated		Not rated		Not rated	
142:							
Ordeal	40	Poor		Poor		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
						Sand fraction 75 to 85 percent	0.38
						Depth to bedrock 20 to 40"	0.84
Longsfolly	35	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.14	Rock fragment content	0.01
						Sand fraction 75 to 85 percent	0.38
Passion	15	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.09	Depth to bedrock <20"	0.00
						Slope >15 percent	0.00
						Sand fraction 75 to 85 percent	0.01
146:							
Badlands, scarps in conglomerate	90	Not rated		Not rated		Not rated	
148:							
Backdoor	55	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.11	Sand fraction 75 to 85 percent	0.22
						pH 4.5 to 6.5	0.98
Tuborcio	30	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
152:							
Backdoor----------------	85	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.11	Sand fraction 75 to 85 percent	0.22
155:							
Chalone-----------------	40	Fair		Fair		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer possible source	0.03	Thickest layer possible source	0.03	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.16
Knuckle-----------------	35	Poor		Fair		Poor	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.07	Depth to bedrock <20"	0.00
						Rock fragment content	0.00
						Sand fraction 75 to 85 percent	0.47
Rock outcrop, rhyolite--	15	Not rated		Not rated		Not rated	
156:							
Chalone-----------------	45	Poor		Fair		Poor	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer possible source	0.04	Slope >15 percent	0.00
				Thickest layer possible source	0.04	Rock fragment content	0.00
		Bottom layer not a source	0.00			Depth to bedrock 20 to 40"	0.90
Knuckle-----------------	25	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Depth to bedrock <20"	0.00
						Sand fraction 75 to 85 percent	0.15
Firstsister-------------	15	Fair		Fair		Poor	
		Bottom layer possible source	0.32	Thickest layer possible source	0.03	Slope >15 percent	0.00
		Thickest layer possible source	0.32			Rock fragment content	0.00
				Bottom layer possible source	0.04	Hard to reclaim	0.00
PgE:							
Pinnacles---------------	85	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay >40 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Slope >15 percent	0.00
						Depth to bedrock 20 to 40"	0.52
						pH 4.5 to 6.5	0.76

Table 10a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct of map unit	Potential source of gravel: Rating class and limiting features	Value	Potential source of sand: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
PhG2:							
Pinnacles---------------	50	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
						Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.52
						pH 4.5 to 6.5	0.76
PnE2:							
Pinnacles---------------	85	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
						Depth to bedrock 20 to 40"	0.28
						pH 4.5 to 6.5	0.98
PnG3:							
Pinnacles---------------	85	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay >40 percent	0.00
						Depth to bedrock 20 to 40"	0.28
						pH 4.5 to 6.5	0.98
SdG3:							
Santa Lucia-------------	85	Poor		Poor		Poor	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope >15 percent	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Depth to bedrock 20 to 40"	0.54

The interpretations for a source of gravel evaluate coarse fragments greater than 0.2 inch in diameter in the bottom layer or in the thickest layer of the soil.

The interpretations for a source of sand evaluate the amount of sand and fine gravel in the thickest layer or in the bottom layer of the soil. Organic soil layers with a Unified engineering class for peat (PT) are also evaluated.

The interpretations for a source of topsoil evaluate the following soil properties at varying depths: Calcium carbonates, clay content, soil bulk density, sand content, soil wetness, coarse fragments 0.2 to 3.0 inches in diameter, fragments greater than 3 inches in diameter, organic matter content (OM), sodium content expressed as the sodium adsorption ratio (SAR), salinity expressed as dS/m of electrical conductivity (EC), depth to bedrock, slope, and soil pH.

Table 10b.--Construction Materials (Part 2)

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The closer the value is to 0, the greater the potential limitation. Values of 0 are absolute limitations. Values closer to 1.00 have less of a limitation. Values of 1.00 have absolutely no limitation. Rating classes are determined by the most limiting value. Fine-earth fraction and fragment content are given on a weight basis. A brief summary of the rating criteria and a definition of some of the abbreviations are given at the end of the table)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
101:					
Ordeal	50	Poor		Poor	
		WEG 1 or 2	0.00	Depth to bedrock <40"	0.00
		AWC <3" to a depth of 60"	0.00	Slopes >25 percent	0.00
		Sand fraction 75 to 85 percent	0.76		
Passion	30	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		Sand fraction 75 to 85 percent	0.02		
Badlands	10	Not rated		Not rated	
104:					
Knuckle	35	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		Sand fraction 75 to 85 percent	0.34	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.44		
Burgundy	25	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.68	Slopes >25 percent	0.00
Argixerolls	15	Poor		Poor	
		OM <0.5 percent	0.00	Depth to bedrock <40"	0.00
		AWC <3" to a depth of 60"	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.44		
105:					
Chalone	35	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.92		
Firstsister	35	Fair		Poor	
		AWC 3 to 6" to a depth of 60"	0.23	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.84		
Highpeaks	20	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.76	Slopes >25 percent	0.00

Table 10b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
106:					
Casino	50	Poor		Poor	
		Clay >40 percent	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.92	AASHTO GIN >8 (low soil strength)	0.00
				LEP 3 to 9	0.25
Argixerolls	30	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
107:					
Casino	70	Poor		Poor	
		Clay >40 percent	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		AWC 3 to 6" to a depth of 60"	1.00	AASHTO GIN >8 (low soil strength)	0.00
				LEP 3 to 9	0.25
109:					
Rock outcrop, pinnacles of rhyolitic breccia	35	Not rated		Not rated	
Highpeaks	35	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
				Slopes >25 percent	0.00
Burgundy	20	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
				Slopes >25 percent	0.00
110:					
Knuckle	35	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		Sand fraction 75 to 85 percent	0.03		
		pH 4.0 to 6.5 to a depth of 40"	0.44		
Chalone	30	Poor		Poor	
		OM <0.5 percent	0.00	Depth to bedrock <40"	0.00
		AWC 3 to 6" to a depth of 60"	0.03	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.60		
Burgundy	20	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
				Slopes >25 percent	0.00
111:					
Backdoor sandy loam	35	Poor		Poor	
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.40		
		Sand fraction 75 to 85 percent	0.50		
		AWC 3 to 6" to a depth of 60"	0.87		

Table 10b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value
111:					
Backdoor gravelly sandy loam	30	Poor		Poor	
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.52		
		AWC 3 to 6" to a depth of 60"	0.96		
Tuborcio	20	Fair		Poor	
		pH 4.0 to 6.5 to a depth of 40"	0.64	Slopes >25 percent	0.00
		AWC 3 to 6" to a depth of 60"	0.79	LEP 3 to 9	0.43
112:					
Rimtrail	85	Fair		Fair	
		Clay 27 to 40 percent	0.82	AASHTO GIN 5 to 8 (soil strength)	0.22
113:					
Elder	40	Fair		Good	
		AWC 3 to 6" to a depth of 60"	0.83		
		pH 4.0 to 6.5 to a depth of 40"	0.84		
Oxyaquic Haploxerolls, rarely flooded	40	Fair		Fair	
		AWC 3 to 6" to a depth of 60"	0.06	Saturated from 1 to 3'	0.99
114:					
Ordeal	40	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		Sand fraction 75 to 85 percent	0.15		
		pH 4.0 to 6.5 to a depth of 40"	0.40		
Tuborcio	35	Poor		Poor	
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		Clay >40 percent	0.00	LEP 3 to 9	0.28
		pH 4.0 to 6.5 to a depth of 40"	0.64		
Passion	15	Poor		Poor	
		WEG 1 or 2	0.00	Depth to bedrock <40"	0.00
		AWC <3" to a depth of 60"	0.00	Slopes >25 percent	0.00
		Sand fraction 75 to 85 percent	0.76		
		pH 4.0 to 6.5 to a depth of 40"	0.84		
115:					
Tuborcio	80	Poor		Poor	
		OM <0.5 percent	0.00	AASHTO GIN >8 (low soil strength)	0.00
		Clay >40 percent	0.00	LEP 3 to 9	0.25
		pH 4.0 to 6.5 to a depth of 40"	0.64		
117:					
Elder	80	Fair		Good	
		AWC 3 to 6" to a depth of 60"	0.61		

Table 10b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
119:					
Still	80	Poor		Poor	
		Clay >40 percent	0.00	AASHTO GIN >8 (low soil strength)	0.00
				LEP 3 to 9	0.89
120:					
Elder	80	Fair		Good	
		AWC 3 to 6" to a depth of 60"	0.99		
122:					
Tuborcio	80	Poor		Poor	
		Clay >40 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.44	AASHTO GIN >8 (low soil strength)	0.00
				LEP 3 to 9	0.29
123:					
Teapot	60	Poor		Poor	
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.20		
		AWC 3 to 6" to a depth of 60"	0.26		
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated	
127:					
Argixerolls	50	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.92		
Rock outcrop, rhyolite	20	Not rated		Not rated	
Chalone	15	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.56	Fragments (>3") 25 to 50 percent	0.70
		Fragments (3-10") 25 to 50 percent	0.61		
128:					
Still	70	Fair		Poor	
		pH 4.0 to 6.5 to a depth of 40"	0.84	AASHTO GIN >8 (low soil strength)	0.00
				LEP 3 to 9	0.87
Riverwash	20	Not rated		Not rated	
131:					
Firstsister	50	Fair		Poor	
		Fragments (>10") 5 to 15 percent	0.04	Slopes >25 percent	0.00
		AWC 3 to 6" to a depth of 60"	0.45	Fragments (>3") <25 percent	1.00
		pH 4.0 to 6.5 to a depth of 40"	0.84		
		Fragments (3-10") <25 percent	1.00		

Table 10b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
131:					
Oxyaquic Haploxerolls, frequently flooded	15	Poor		Fair	
		OM <0.5 percent	0.00	Saturated from 1 to 3'	0.99
		Fragments (>10") 5 to 15 percent	0.18		
		AWC 3 to 6" to a depth of 60"	0.47		
		pH 4.0 to 6.5 to a depth of 40"	0.60		
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated	
132:					
Toags	50	Fair		Good	
		Sand fraction 75 to 85 percent	0.02		
		AWC 3 to 6" to a depth of 60"	0.14		
		OM 0.5 to 1.0 percent	0.50		
Oxyaquic Haploxerolls, rarely flooded	20	Poor		Fair	
		OM <0.5 percent	0.00	Saturated from 1 to 3'	0.99
		AWC 3 to 6" to a depth of 60"	0.06		
		pH 4.0 to 6.5 to a depth of 40"	0.40		
		Sand fraction 75 to 85 percent	0.68		
Riverwash	15	Not rated		Not rated	
133:					
Toags	50	Poor		Good	
		Sand fraction >85 percent	0.00		
		AWC 3 to 6" to a depth of 60"	0.29		
		pH 4.0 to 6.5 to a depth of 40"	0.84		
Pinncamp	30	Fair		Good	
		Sand fraction 75 to 85 percent	0.09		
		AWC 3 to 6" to a depth of 60"	0.47		
		pH 4.0 to 6.5 to a depth of 40"	0.72		
134:					
Toags	70	Fair		Good	
		AWC 3 to 6" to a depth of 60"	0.15		
		OM 0.5 to 1.0 percent	0.50		
		Sand fraction 75 to 85 percent	0.76		
		pH 4.0 to 6.5 to a depth of 40"	0.84		
135:					
Toags	50	Fair		Good	
		AWC 3 to 6" to a depth of 60"	0.29		
		Sand fraction 75 to 85 percent	0.76		
Riverwash	35	Not rated		Not rated	

Table 10b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
136:					
Oxyaquic Haploxerolls, ponded-----	90	Poor		Poor	
		Clay >40 percent	0.00	Saturated within 1'	0.00
				LEP 3 to 9	0.67
138:					
Rock outcrop, rhyolite or breccia	40	Not rated		Not rated	
Highpeaks------------------------	30	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.64	Slopes >25 percent	0.00
Chalone--------------------------	15	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.84		
139:					
Highpeaks------------------------	75	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.80	Slopes >25 percent	0.00
Rock outcrop, rhyolitic breccia---	15	Not rated		Not rated	
142:					
Ordeal---------------------------	40	Poor		Poor	
		WEG 1 or 2	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		AWC <3" to a depth of 60"	0.00		
		Sand fraction 75 to 85 percent	0.76		
		pH 4.0 to 6.5 to a depth of 40"	0.76		
Longsfolly-----------------------	35	Poor		Poor	
		WEG 1 or 2	0.00	Slopes >25 percent	0.00
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.52		
		Sand fraction 75 to 85 percent	0.76		
Passion--------------------------	15	Poor		Poor	
		WEG 1 or 2	0.00	Depth to bedrock <40"	0.00
		AWC <3" to a depth of 60"	0.00	Slopes 15 to 25 percent	0.18
		OM <0.5 percent	0.00		
		Sand fraction 75 to 85 percent	0.02		
146:					
Badlands, scarps in conglomerate--	90	Not rated		Not rated	

Table 10b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
148:					
Backdoor	55	Poor		Poor	
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.40		
		Sand fraction 75 to 85 percent	0.50		
		AWC 3 to 6" to a depth of 60"	0.87		
Tuborcio	30	Poor		Poor	
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		Clay >40 percent	0.00	AASHTO GIN >8 (low soil strength)	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.84	LEP 3 to 9	0.25
152:					
Backdoor	85	Poor		Good	
		OM <0.5 percent	0.00		
		Sand fraction 75 to 85 percent	0.50		
		pH 4.0 to 6.5 to a depth of 40"	0.80		
		AWC 3 to 6" to a depth of 60"	0.94		
155:					
Chalone	40	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		OM <0.5 percent	0.00	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.88		
Knuckle	35	Poor		Poor	
		WEG 1 or 2	0.00	Depth to bedrock <40"	0.00
		AWC <3" to a depth of 60"	0.00	Slopes >25 percent	0.00
		OM <0.5 percent	0.00		
		pH 4.0 to 6.5 to a depth of 40"	0.76		
		Sand fraction 75 to 85 percent	0.85		
Rock outcrop, rhyolite	15	Not rated		Not rated	
156:					
Chalone	45	Poor		Poor	
		OM <0.5 percent	0.00	Depth to bedrock <40"	0.00
		AWC 3 to 6" to a depth of 60"	0.61	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.84		
Knuckle	25	Poor		Poor	
		WEG 1 or 2	0.00	Depth to bedrock <40"	0.00
		Fragments (>10") >15 percent	0.00	Slopes >25 percent	0.00
		OM <0.5 percent	0.00		
		AWC <3" to a depth of 60"	0.00		
		Sand fraction 75 to 85 percent	0.34		
		pH 4.0 to 6.5 to a depth of 40"	0.44		
Firstsister	15	Fair		Poor	
		AWC 3 to 6" to a depth of 60"	0.09	Slopes >25 percent	0.00

Table 10b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
PgE:					
Pinnacles	85	Poor		Poor	
		Clay >40 percent	0.00	Depth to bedrock <40"	0.00
		AWC 3 to 6" to a depth of 60"	0.03	LEP 3 to 9	0.75
		pH 4.0 to 6.5 to a depth of 40"	0.32	Slopes 15 to 25 percent	0.82
		OM 0.5 to 1.0 percent	0.50		
		K factor <0.10	0.99		
PhG2:					
Pinnacles	50	Poor		Poor	
		Clay >40 percent	0.00	Depth to bedrock <40"	0.00
		AWC 3 to 6" to a depth of 60"	0.03	Slopes >25 percent	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.32	LEP 3 to 9	0.75
		OM 0.5 to 1.0 percent	0.50		
PnE2:					
Pinnacles	85	Poor		Poor	
		OM <0.5 percent	0.00	Depth to bedrock <40"	0.00
		Clay >40 percent	0.00	AASHTO GIN >8 (low soil strength)	0.00
		AWC 3 to 6" to a depth of 60"	0.03	Slopes 15 to 25 percent	0.08
		pH 4.0 to 6.5 to a depth of 40"	0.52	LEP 3 to 9	0.38
PnG3:					
Pinnacles	85	Poor		Poor	
		OM <0.5 percent	0.00	Depth to bedrock <40"	0.00
		Clay >40 percent	0.00	Slopes >25 percent	0.00
		AWC 3 to 6" to a depth of 60"	0.03	AASHTO GIN >8 (low soil strength)	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.52	LEP 3 to 9	0.38
SdG3:					
Santa Lucia	85	Poor		Poor	
		AWC <3" to a depth of 60"	0.00	Depth to bedrock <40"	0.00
		pH 4.0 to 6.5 to a depth of 40"	0.84	Slopes >25 percent	0.00
				AASHTO GIN >8 (low soil strength)	0.00

The interpretations for source of reclamation material evaluate the following soil properties at varying depths in the soil: Sand and clay content, fragment content, organic matter content (OM), wind erodibility group (WEG), available water capacity (AWC), soil pH, salinity (EC), sodium content (SAR), carbonate content, and susceptibility of the soil to erosion by water (K factor).

The interpretations for source of roadfill evaluate the following soil properties at varying depths in the soil: Shrink-swell potential expressed as linear extensibility percent (LEP), depth to rock or a cemented pan, wetness, slope, soil strength expressed as AASHTO Group Index Number (AASHTO GIN), and fragment content.

Table 11.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The rating is based on the limitation with the highest value. Only the three limitations with the highest value are lisited. There may be more limitations. Fine-earth fraction and coarse fragment content are given on a weight basis. A brief summary of the rating criteria and a definition of some of the abbreviations are given at the end of the table)

Map symbol and soil name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
101:					
Ordeal	50	Seepage	1.00	Slopes >7 percent	1.00
		Thin layer	0.65	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock 20 to 60"	0.65
Passion	30	Thin layer	1.00	Slopes >7 percent	1.00
		Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock <20"	1.00
Badlands	10	Not rated		Not rated	
104:					
Knuckle	35	Thin layer	1.00	Slopes >7 percent	1.00
		Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock <20"	1.00
Burgundy	25	Thin layer	1.00	Slopes >7 percent	1.00
				Depth to bedrock <20"	1.00
Argixerolls	15	Thin layer	0.94	Slopes >7 percent	1.00
		Fragments (>3") 15 to 35 percent	0.04	Depth to bedrock 20 to 60"	0.94
105:					
Chalone	35	Thin layer	0.99	Slopes >7 percent	1.00
				Depth to bedrock <20"	0.99
				Permeability 0.6-2"/hr (some seepage)	0.53
Firstsister	35	Fragments (>3") 15 to 35 percent	0.01	Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
Highpeaks	20	Thin layer	1.00	Slopes >7 percent	1.00
				Depth to bedrock <20"	1.00
				Permeability 0.6-2"/hr (some seepage)	0.53
106:					
Casino	50	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		Thin layer	0.63	Depth to bedrock 20 to 60"	0.63
		MH or CH Unified class and PI <40 percent	0.50		
Argixerolls	30	Thin layer	1.00	Slopes >7 percent	1.00
		Shrink-swell (LEP 3 to 6)	0.50	Depth to bedrock <20"	1.00

Table 11.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Embankments, dikes, and levees: Limitations	Value	Pond reservoir areas: Limitations	Value
107:					
Casino	70	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		Thin layer	0.82	Depth to bedrock 20 to 60"	0.82
		MH or CH Unified class and PI <40 percent	0.50		
109:					
Rock outcrop, pinnacles of rhyolitic breccia	35	Not rated		Not rated	
Highpeaks	35	Thin layer	1.00	Slopes >7 percent	1.00
		Fragments (>3") 15 to 35 percent	0.01	Depth to bedrock <20"	1.00
				Permeability 0.6-2"/hr (some seepage)	0.53
Burgundy	20	Thin layer	1.00	Slopes >7 percent	1.00
				Depth to bedrock <20"	1.00
110:					
Knuckle	35	Thin layer	1.00	Slopes >7 percent	1.00
		Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock <20"	1.00
Chalone	30	Thin layer	0.93	Slopes >7 percent	1.00
				Depth to bedrock 20 to 60"	0.93
				Permeability 0.6-2"/hr (some seepage)	0.53
Burgundy	20	Thin layer	1.00	Slopes >7 percent	1.00
				Depth to bedrock <20"	1.00
111:					
Backdoor sandy loam	35	Possible seepage	0.50	Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
Backdoor gravelly sandy loam	30	Possible seepage	0.50	Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
Tuborcio	20	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
112:					
Rimtrail	85	No limitations		Permeability 0.6-2"/hr (some seepage)	0.53
				Slopes 2 to 7 percent	0.01
113:					
Elder	40	No limitations		Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 7 percent	0.08
Oxyaquic Haploxerolls, rarely flooded	40	Saturated from 2 to 4'	0.65	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 7 percent	0.08

Table 11.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Embankments, dikes, and levees: Limitations	Value	Pond reservoir areas: Limitations	Value
114:					
Ordeal	40	Seepage	1.00	Slopes >7 percent	1.00
		Thin layer	0.87	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock 20 to 60"	0.87
Tuborcio	35	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
				Permeability 0.6-2"/hr (some seepage)	0.53
Passion	15	Thin layer	1.00	Slopes >7 percent	1.00
		Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock <20"	1.00
115:					
Tuborcio	80	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		MH or CH Unified class and PI <40 percent	0.50	Permeability 0.6-2"/hr (some seepage)	0.53
117:					
Elder	80	Seepage	1.00	Permeability >2"/hr (seepage)	1.00
119:					
Still	80	No limitations		Permeability 0.6-2"/hr (some seepage)	0.53
120:					
Elder	80	Seepage	1.00	Permeability >2"/hr (seepage)	1.00
122:					
Tuborcio	80	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		MH or CH Unified class and PI <40 percent	0.50	Permeability 0.6-2"/hr (some seepage)	0.53
123:					
Teapot	60	No limitations		Slopes >7 percent	1.00
				Permeability 0.6-2"/hr (some seepage)	0.53
Rock outcrop, diatomaceous mudstone	30	Not rated		Not rated	
127:					
Argixerolls	50	Thin layer	0.91	Slopes >7 percent	1.00
				Depth to bedrock 20 to 60"	0.91
				Permeability 0.6-2"/hr (some seepage)	0.53
Rock outcrop, rhyolite	20	Not rated		Not rated	
Chalone	15	Fragments (>3") >35 percent	1.00	Slopes >7 percent	1.00
		Thin layer	0.99	Depth to bedrock <20"	0.99
				Permeability 0.6-2"/hr (some seepage)	0.53
128:					
Still	70	Shrink-swell (LEP 3 to 6)	0.50	Permeability 0.6-2"/hr (some seepage)	0.53
Riverwash	20	Not rated		Not rated	

Table 11.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
131:					
Firstsister-----------------------	50	Fragments (>3") >35 percent	1.00	Slopes >7 percent	1.00
				Permeability 0.6-2"/hr (some seepage)	0.53
Oxyaquic Haploxerolls, frequently flooded-------------------------	15	Saturated from 2 to 4'	0.65	Permeability >2"/hr (seepage)	1.00
		Slight seepage	0.10		
Rock outcrop, rhyolite or breccia	15	Not rated		Not rated	
132:					
Toags----------------------------	50	Seepage	1.00	Permeability >2"/hr (seepage)	1.00
Oxyaquic Haploxerolls, rarely flooded-------------------------	20	Seepage	1.00	Permeability >2"/hr (seepage)	1.00
		Saturated from 2 to 4'	0.65		
Riverwash------------------------	15	Not rated		Not rated	
133:					
Toags----------------------------	50	Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 7 percent	0.08
Pinncamp-------------------------	30	Possible seepage	0.50	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 7 percent	0.08
134:					
Toags----------------------------	70	Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 7 percent	0.66
135:					
Toags----------------------------	50	Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Slopes 2 to 7 percent	0.66
Riverwash------------------------	35	Not rated		Not rated	
136:					
Oxyaquic Haploxerolls, ponded-----	90	Ponded (any duration)	1.00	Permeability 0.6-2"/hr (some seepage)	0.53
		Saturated within 2'	1.00		
		Shrink-swell (LEP 3 to 6)	0.50		
138:					
Rock outcrop, rhyolite or breccia-	40	Not rated		Not rated	
Highpeaks------------------------	30	Thin layer	1.00	Slopes >7 percent	1.00
		Fragments (>3") 15 to 35 percent	0.11	Depth to bedrock <20"	1.00
				Permeability 0.6-2"/hr (some seepage)	0.53
Chalone--------------------------	15	Thin layer	0.98	Slopes >7 percent	1.00
		Fragments (>3") 15 to 35 percent	0.01	Depth to bedrock 20 to 60"	0.98
				Permeability 0.6-2"/hr (some seepage)	0.53

Table 11.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Embankments, dikes, and levees: Limitations	Value	Pond reservoir areas: Limitations	Value
139:					
Highpeaks-------------------------	75	Thin layer	1.00	Slopes >7 percent	1.00
				Depth to bedrock <20"	1.00
				Permeability 0.6-2"/hr (some seepage)	0.53
Rock outcrop, rhyolitic breccia---	15	Not rated		Not rated	
142:					
Ordeal----------------------------	40	Seepage	1.00	Slopes >7 percent	1.00
		Thin layer	0.65	Permeability >2"/hr (seepage)	1.00
		Fragments (>3") 15 to 35 percent	0.01	Depth to bedrock 20 to 60"	0.65
Longsfolly------------------------	35	Seepage	1.00	Slopes >7 percent	1.00
		Thin layer	0.50	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock 20 to 60"	0.50
Passion---------------------------	15	Thin layer	1.00	Slopes >7 percent	1.00
		Seepage	1.00	Permeability >2"/hr (seepage)	1.00
				Depth to bedrock <20"	1.00
146:					
Badlands, scarps in conglomerate--	90	Not rated		Not rated	
148:					
Backdoor--------------------------	55	Possible seepage	0.50	Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
Tuborcio--------------------------	30	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		MH or CH Unified class and PI <40 percent	0.50	Permeability 0.6-2"/hr (some seepage)	0.53
152:					
Backdoor--------------------------	85	Possible seepage	0.50	Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
155:					
Chalone---------------------------	40	Thin layer	0.99	Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
				Depth to bedrock 20 to 60"	0.99
Knuckle---------------------------	35	Thin layer	1.00	Slopes >7 percent	1.00
				Depth to bedrock <20"	1.00
Rock outcrop, rhyolite------------	15	Not rated		Not rated	
156:					
Chalone---------------------------	45	Thin layer	0.59	Slopes >7 percent	1.00
				Depth to bedrock 20 to 60"	0.59
				Permeability 0.6-2"/hr (some seepage)	0.53

Table 11.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
156:					
Knuckle	25	Thin layer	1.00	Slopes >7 percent	1.00
		Seepage	1.00	Depth to bedrock <20"	1.00
		Fragments (>3") 15 to 35 percent	0.82		
Firstsister	15	No limitations		Slopes >7 percent	1.00
				Permeability >2"/hr (seepage)	1.00
PgE:					
Pinnacles	85	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		Thin layer	0.86	Depth to bedrock 20 to 60"	0.86
				Permeability 0.6-2"/hr (some seepage)	0.53
PhG2:					
Pinnacles	50	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		Thin layer	0.86	Depth to bedrock 20 to 60"	0.86
		Fragments (>3") 15 to 35 percent	0.01	Permeability 0.6-2"/hr (some seepage)	0.53
PnE2:					
Pinnacles	85	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		Thin layer	0.96	Depth to bedrock 20 to 60"	0.96
		MH or CH Unified class and PI <40 percent	0.50		
PnG3:					
Pinnacles	85	Shrink-swell (LEP >6)	1.00	Slopes >7 percent	1.00
		Thin layer	0.96	Depth to bedrock 20 to 60"	0.96
		MH or CH Unified class and PI <40 percent	0.50		
SdG3:					
Santa Lucia	85	High piping potential	0.94	Slopes >7 percent	1.00
		Thin layer	0.85	Depth to bedrock 20 to 60"	0.85
				Permeability 0.6-2"/hr (some seepage)	0.53

The interpretations for embankments, dikes, and levees evaluate the following soil properties at varying depths in the soil: Ponding; wetness; depth to a restrictive layer; fragments greater than 3 inches in diameter; salinity (EC); Unified classes for high organic content (PT, OL, OH); Unified classes that are hard to pack (MH, CH); permeability that is too high, resulting in seepage; piping as determined by Atterberg limits of liquid limit (LL) and plasticity index (PI); sodium content (SAR); and gypsum content.

The interpretations for pond reservoir areas evaluate the following soil properties at varying depths in the soil: Slope, depth to hard or soft bedrock, depth to a cemented pan, marly textures, gypsum content, and permeability that is too high, resulting in seepage.

Table 12.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
101:												
Ordeal	0-5	Sandy loam	SC-SM	A-2-4, A-4	0	0	100	84-100	58-77	27-40	0-26	NP-6
	5-16	Very gravelly loamy sand	SC-SM	A-1-b, A-1-a	0	0	81-93	38-53	29-44	10-19	0-25	NP-6
	16-21	Extremely gravelly sandy loam	SC-SM	A-1-a, A-1-b	0	36-48	82-91	21-40	14-31	7-16	0-23	NP-6
	21-25	Bedrock			---	---	---	---	---	---	---	---
Passion	0-3	Gravelly loamy sand	SC-SM	A-1-b, A-2-4	0	0	100	53-92	40-77	14-32	0-27	NP-6
	3-8	Gravelly loamy sand	SC-SM	A-1-b, A-2-4	0	0	100	53-92	40-77	14-32	0-27	NP-6
	8-13	Very gravelly loamy coarse sand	SP-SM	A-1-a, A-1-b	0	0	73-76	34-54	17-32	6-14	0-22	NP-6
	13-61	Very gravelly loamy sand	SP-SM, SC-SM	A-1-a, A-1-b, A-2-4	0	0	74-100	33-92	25-77	9-32	0-22	NP-6
Badlands	---	---	---	---	---	---	---	---	---	---	---	---
104:												
Knuckle	0-6	Very gravelly loamy sand	SW-SM, SM	A-1-b	0	0	71-81	36-56	28-47	10-19	0-21	NP-4
	6-17	Very gravelly loamy sand	SW-SM, SM	A-1-b, A-2-4	0	0	71-88	36-61	28-51	10-21	0-20	NP-4
	17-20	Extremely gravelly loamy sand	GP, SP-SM	A-1-a	0	0	34-56	6-31	5-26	2-11	0-20	NP-4
	20-21	Bedrock			---	---	---	---	---	---	---	---
Burgundy	0-1	Extremely gravelly coarse sandy loam	GW-GM	A-2-4	0	0	31-38	22-30	16-23	8-12	22-39	6-9
	1-6	Extremely gravelly coarse sandy loam	GW-GM	A-2-4	0	0	31-38	22-30	16-23	8-12	22-39	6-9
	6-7	Bedrock			---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
104:												
Argixerolls	0-4	Gravelly sandy loam	SC-SM	A-2-4	0	0	76-100	40-79	29-62	14-32	21-29	6-10
	4-10	Loam	CL, SC	A-6	0	0-14	100	69-100	60-91	43-67	28-34	12-15
	10-27	Very cobbly clay loam, very cobbly loam, very gravelly sandy loam, extremely gravelly sandy loam, extremely gravelly sandy clay loam	SC, SP-SC	A-2-6	0	29-52	54-82	7-65	5-58	3-39	24-42	9-21
	27-31	Bedrock			---	---	---	---	---	---	---	---
105:												
Chalone	0-3	Very gravelly loamy coarse sand	SP-SC, SW-SC	A-1-a	0	0	64-70	35-40	17-22	5-9	17-24	2-6
	3-8	Very gravelly coarse sandy loam	SP-SC, SC	A-2-6	0	0	64-69	34-39	20-26	11-16	20-30	6-12
	8-20	Very gravelly coarse sandy loam	SC, SP-SC	A-2-6	0	0	64-69	34-39	20-26	11-16	20-30	6-12
	20-33	Bedrock			---	---	---	---	---	---	---	---
Firstsister	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	1-5	Gravelly sandy loam	GM	A-2-4	0	0	63-82	54-78	39-67	19-37	18-37	2-12
	5-22	Very gravelly sandy loam	GM, GP-GM	A-2-4	0	0-28	37-63	22-54	16-46	8-26	18-37	2-12
	22-59	Extremely gravelly sandy loam	GC-GM, GM, GP-GM	A-1-a	0	0-27	25-63	8-55	6-45	3-25	18-26	2-6
Highpeaks	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-5	Gravelly coarse sandy loam	SC, SP-SC	A-2-4, A-2-6	0	0	59-77	18-54	13-44	6-24	23-32	7-12
	5-13	Very gravelly coarse sandy loam	SC, GP	A-2-6, A-2-4	0	0	36-77	5-54	3-44	2-24	23-32	7-12
	13-21	Bedrock			---	---	---	---	---	---	---	---
	21-22	Bedrock			---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
106:												
Casino-------------------------	0-4	Loam	CH	A-7-6	0	0	84-100	76-100	65-95	51-75	43-56	21-27
	4-10	Clay loam	CH	A-7-6	0	0	84-100	76-100	65-95	51-75	43-56	21-27
	10-20	Clay	CH	A-7-6	0	0	91-100	91-100	73-100	63-91	49-70	27-44
	20-37	Clay	CH	A-7-6	0	0	93-100	92-100	69-97	62-90	49-70	27-44
	37-38	Bedrock			---	---	---	---	---	---	---	---
Argixerolls--------------------	0-2	Very gravelly loam	GC	A-2-6, A-2-7, A-6, A-7-6	0	0	51-93	30-85	24-85	17-66	27-47	10-25
	2-6	Extremely gravelly loam, clay, very gravelly loam	GP-GC, GC	A-2-6, A-2-7, A-6, A-7-6	0	0-14	13-100	7-100	6-100	5-100	35-69	17-44
	6-7	Extremely gravelly clay loam, clay, extremely stony clay loam	GP-GC, GC	A-2-6, A-2-7, A-6, A-7-6	0-48	0-20	17-70	6-70	6-70	5-65	39-61	21-37
	7-11	Bedrock			---	---	---	---	---	---	---	---
107:												
Casino-------------------------	0-1	Sandy clay loam	CH	A-7-6	0	0	100	76-100	62-97	34-60	34-53	14-25
	1-7	Clay loam, gravelly sandy clay loam	CH	A-7-6	0	0	84-100	62-100	51-97	28-60	34-53	14-25
	7-12	Clay, gravelly clay loam	CH	A-7-6	0	0	85-100	50-100	45-97	36-77	46-53	25-29
	12-21	Clay, gravelly clay loam	CH	A-7-6	0	0	85-100	50-100	44-95	35-76	46-53	25-29
	21-31	Clay, gravelly clay	CH	A-7-6	0	0	71-100	51-100	39-97	36-90	50-70	29-44
	31-33	Bedrock			---	---	---	---	---	---	---	---
109:												
Rock outcrop, pinnacles of rhyolitic breccia-------------	---	---	---	---	---	---	---	---	---	---	---	---
Highpeaks----------------------	0-3	Gravelly sandy loam	SC, SP-SC	A-2-6, A-2-4	0	0	60-92	20-84	14-68	7-37	23-32	7-12
	3-8	Very gravelly sandy loam	SC, GP	A-2-4, A-2-6	0	8-48	37-83	5-75	4-61	2-33	23-32	7-12
	8-15	Very gravelly sandy loam	SC, GP	A-2-4, A-2-6	0	8-48	37-83	5-75	4-61	2-33	23-32	7-12
	15-16	Bedrock			---	---	---	---	---	---	---	---
Burgundy-----------------------	0-1	Extremely gravelly sandy loam	GW-GM, GM	A-2-4	0	0	31-55	22-50	16-38	8-20	22-39	6-9
	1-6	Very gravelly sandy loam	GW-GM, GM	A-2-4	0	0	38-60	30-55	22-42	11-22	22-39	6-9
	6-8	Bedrock			---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
110:												
Knuckle	0-3	Gravelly sandy loam	SM, SC-SM	A-2-4, A-1-b	0	0	87-93	61-79	43-62	20-32	0-24	NP-6
	3-12	Gravelly loamy sand	SP-SM, SC-SM	A-2-4, A-1-b	0	0	87-93	56-67	42-54	10-16	0-21	NP-4
	12-17	Very gravelly loamy sand	SW-SM	A-1-b, A-1-a	0	0	64-65	36-40	27-33	6-10	0-21	NP-4
	17-23	Bedrock			---	---	---	---	---	---	---	---
Chalone	0-1	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	1-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-8	Gravelly sandy loam	SC, SC-SM	A-1-b, A-2-6, A-2-4	0	0	80-93	55-79	39-63	18-34	21-31	6-12
	8-12	Extremely gravelly sandy clay loam	GW, GC, GP-GC	A-2-6	0	0	24-41	6-30	5-27	2-16	30-40	15-21
	12-30	Extremely gravelly sandy clay loam	GP-GC, GW, GC	A-2-6	0	0	25-37	6-25	5-23	3-13	30-40	15-21
	30-34	Bedrock			---	---	---	---	---	---	---	---
Burgundy	0-2	Gravelly sandy loam	GM	A-2-4	0	0	60-70	55-66	40-51	19-26	31-48	5-9
	2-5	Extremely gravelly sandy loam	GW-GM, GM	A-2-4	0	0	31-42	22-35	16-27	8-14	22-39	6-9
	5-6	Bedrock			---	---	---	---	---	---	---	---
111:												
Backdoor sandy loam	0-5	Sandy loam	CL-ML, CL, SC-SM, SC	A-6, A-4	0	0	80-93	76-91	52-78	30-52	20-39	4-18
	5-10	Gravelly loam, sandy loam	CL	A-6	0	0	80-93	76-91	63-82	46-62	28-39	12-18
	10-15	Gravelly clay loam	SC, CL	A-7-6, A-2-6, A-6, A-2-7	0	0	45-93	35-91	28-85	21-67	31-46	13-25
	15-27	Very paragravelly sandy clay loam	SC, CL	A-7-6, A-6	0	0	100	100	82-97	45-60	31-46	13-25
	27-60	Extremely paragravelly loamy coarse sand, loamy sand, sandy loam	SC, SC-SM	A-6, A-4	0	0	100	100	56-71	24-39	16-30	2-13

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
111:												
Backdoor gravelly sandy loam---	0-4	Gravelly sandy loam	CL-ML, CL, SC-SM, SC	A-6, A-4	0	0	58-80	51-76	39-71	25-50	20-39	4-18
	4-17	Gravelly clay loam	SC, CL	A-7-6, A-2-6, A-6, A-2-7	0	0	45-93	35-91	29-88	22-70	31-46	13-25
	17-28	Very paragravelly sandy clay loam	SC, CL	A-7-6, A-6	0	0	100	100	82-97	45-60	31-46	13-25
	28-60	Extremely paragravelly loamy coarse sand	SC-SM	A-2-4	0	0	100	100	51-61	19-29	0-23	NP-6
Tuborcio-----------------------	0-3	Gravelly sandy loam	SC, SC-SM	A-2-4, A-1-b	0	0	100	70-77	49-65	24-39	22-33	6-12
	3-14	Gravelly sandy loam	SC, SC-SM	A-1-b, A-2-4	0	0	100	70-77	49-65	24-39	22-33	6-12
	14-21	Gravelly sandy loam	SC, SC-SM	A-1-b, A-2-4	0	0	100	52-77	36-65	18-39	22-33	6-12
	21-28	Gravelly sandy clay	CL, CH	A-2-7	0	0	100	49-91	40-80	26-56	49-60	29-37
	28-33	Gravelly sandy clay	SC	A-2-7	0	0	100	49-75	40-66	26-46	49-60	29-37
	33-41	Extremely paragravelly sandy clay loam	SC	A-7-6, A-6	0	0	100	100	82-90	43-54	32-47	14-25
112:												
Rimtrail-----------------------	0-2	Sandy loam, loam	ML, SM	A-4, A-7-5	0	0	79-100	77-100	59-80	28-52	35-49	8-11
	2-11	Sandy loam, loam	SM	A-4, A-7-5	0	0	79-92	77-92	59-74	28-48	35-49	8-11
	11-22	Sandy loam, loam	SM, ML	A-4, A-7-5	0	0	79-100	77-100	59-80	28-52	35-49	8-11
	22-29	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0	0	78-100	76-100	60-92	38-67	34-50	17-27
	29-45	Clay loam, sandy clay loam	CL, SC	A-7-6, A-6	0	0	78-100	76-100	60-92	38-67	34-50	17-27
	45-59	Clay loam, sandy clay loam	CL, SC	A-7-6, A-6	0	0	78-100	76-100	60-92	38-67	34-50	17-27

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
113:												
Elder-------------------------	0-0.5	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	0.5-3	Fine sandy loam	SC-SM	A-4	0	0	88-100	77-100	70-93	32-44	22-30	6-7
	3-20	Loam, gravelly coarse sandy loam	SC-SM	A-4	0	0	88-100	76-100	64-88	45-62	24-33	7-10
	20-22	Gravelly loamy coarse sand, coarse sandy loam	SC-SM	A-2-4	0	0	86-89	71-78	35-43	13-18	20-28	6-10
	22-44	Very gravelly sandy loam, coarse sandy loam	SC-SM	A-2-4	0	0	68-88	37-77	29-63	14-34	20-28	6-10
	44-56	Extremely gravelly loamy coarse sand	SC-SM, SP	A-2-4	0	0	27-82	10-78	5-50	2-24	16-28	2-10
Oxyaquic Haploxerolls, rarely flooded-----------------------	0-2	Sandy loam	SM	A-4, A-2-4	0	0	100	79-100	56-82	26-45	0-33	NP-10
	2-11	Sandy loam	SM	A-4, A-2-4	0	0	100	79-100	56-82	26-45	0-33	NP-10
	11-14	Very gravelly loamy coarse sand, extremely gravelly coarse sandy loam	SP-SM, SM, SP	A-1-b, A-1-a, A-2-4	0	0	100	23-74	12-51	4-26	0-37	NP-13
	14-26	Gravelly sandy loam, extremely gravelly coarse sandy loam	SP-SM, SM	A-1-b, A-1-a, A-2-4	0	0	100	22-72	15-63	7-36	0-37	NP-13
	26-33	Very gravelly sandy loam, extremely gravelly coarse sandy loam	SP-SM, SM, SP	A-1-b, A-1-a, A-2-4, A-3, A-4	0	0-48	100	9-74	7-68	4-41	0-37	NP-13
	33-37	Extremely gravelly coarse sandy loam	SP-SM, SM, SP	A-1-b, A-1-a, A-2-4, A-3	0	0-50	100	9-72	5-54	3-34	0-37	NP-13
	37-59	Extremely cobbly sandy loam, extremely gravelly coarse sandy loam	SP-SM, SM, SP	A-1-b, A-1-a, A-2-4, A-3, A-4	0	13-38	100	10-92	8-85	4-52	0-32	NP-13

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
114:												
Ordeal-------------------------	0-13	Coarse sandy loam	SC-SM	A-2-4	0	0	78-92	77-92	44-62	24-38	17-30	2-10
	13-30	Very gravelly loamy coarse sand	GC-GM, GP-GM	A-1-b	0	0	45-55	43-54	23-31	9-13	16-32	2-6
	30-33	Bedrock			---	---	---	---	---	---	---	---
Tuborcio-----------------------	0-13	Coarse sandy loam	SC, SC-SM	A-1-b, A-2-4	0	0	100	70-92	41-63	24-40	22-33	6-12
	13-17	Clay, clay loam	CL, CH	A-7-6	0	0	100	83-91	71-90	53-74	41-60	21-37
	17-24	Clay	CH, CL	A-7-6	0	0	100	83-91	71-90	53-74	41-60	21-37
	24-40	Clay, clay loam	CH, CL	A-7-6	0	0	100	83-91	71-90	53-74	41-60	21-37
	40-60	Extremely paragravelly sandy clay loam	SC	A-7-6, A-6	0	0	100	100	82-89	43-52	32-43	14-22
Passion------------------------	0-5	Loamy sand	SC-SM	A-2-4	0	0	84-94	80-93	61-78	22-33	0-27	NP-6
	5-11	Gravelly loamy sand	SP-SM, SC-SM	A-1-b, A-2-4	0	0	65-84	56-80	42-66	10-21	0-27	NP-6
	11-17	Very gravelly loamy sand	SP-SM, SC-SM	A-1-b, A-1-a	0	0	45-65	32-56	24-48	9-20	0-23	NP-6
	17-21	Bedrock			---	---	---	---	---	---	---	---
115:												
Tuborcio-----------------------	0-4	Loam	SC, SC-SM	A-2-4	0	0	100	70-92	55-86	35-62	22-34	6-14
	4-14	Clay, clay loam	CL, CH	A-7-6	0	0	100	83-91	71-90	53-74	41-60	21-37
	14-20	Clay, clay loam	CH, CL	A-7-6	0	0	100	83-91	71-90	53-74	41-60	21-37
	20-29	Clay, clay loam	CH, CL	A-7-6	0	0	100	83-91	71-91	50-72	41-60	21-37
	29-45	Clay, clay loam	CH, CL	A-7-6	0	0	100	83-91	71-90	53-74	41-60	21-37
	45-60	Extremely paragravelly sandy clay loam	SC	A-7-6, A-6	0	0	100	100	82-89	43-52	32-43	14-22
117:												
Elder--------------------------	0-3	Gravelly sandy loam	SC-SM	A-2-4	0	0	71-100	64-100	44-77	20-40	20-33	3-10
	3-12	Sandy loam	SC-SM	A-2-4	0	0	71-100	64-100	44-77	20-40	20-33	3-10
	12-24	Sandy loam	SC-SM	A-2-4	0	0	71-100	64-100	44-77	20-40	20-33	3-10
	24-33	Gravelly loamy coarse sand	SC-SM	A-1, A-2-4	0	0	62-94	54-92	28-59	10-28	0-27	NP-10
	33-36	Loam	CL	A-7-6, A-6	0	0	93-100	91-100	81-100	59-80	33-49	13-25
	36-43	Gravelly loamy coarse sand	SC-SM	A-1, A-2-4	0	0	62-94	54-92	32-66	14-35	0-27	NP-10
	43-45	Clay loam	CL	A-6, A-7-6	0	0	93-100	91-100	70-92	52-72	33-49	13-25
	45-61	Gravelly loamy coarse sand	SC-SM	A-1, A-2-4	0	0	62-94	54-92	28-59	10-28	0-27	NP-10

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
119:												
Still-------------------------	0-4	Clay	CH	A-7-6	0	0	100	100	90-95	73-78	51-61	29-32
	4-20	Clay	CH	A-7-6	0	0	100	100	90-95	73-78	51-61	29-32
	20-35	Clay loam	CL	A-7-6	0	0	100	83-100	73-96	57-77	39-51	19-24
	35-59	Loam	CL	A-6	0	0	100	84-100	69-92	51-70	27-38	12-19
120:												
Elder-------------------------	0-3	Coarse sandy loam	SC-SM, SM	A-2-4, A-4	0	0	88-100	77-100	42-73	21-46	0-35	NP-12
	3-24	Gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0	0	88-100	77-100	53-87	24-49	0-35	NP-12
	24-33	Gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0	0	88-100	77-100	48-80	19-43	0-31	NP-12
	33-53	Gravelly loamy coarse sand	SC-SM, SM	A-2-4, A-4	0	0	86-100	71-100	40-75	17-41	0-31	NP-12
	53-59	Loam	CL	A-6, A-7-6	0	0	92-100	84-100	67-92	48-70	26-43	10-19
122:												
Tuborcio----------------------	0-3	Sandy loam	SC, SC-SM	A-2-4	0	0	100	70-92	53-73	27-41	22-34	6-14
	3-13	Sandy clay loam, coarse sandy loam, sandy loam, loam	SC-SM, SC	A-2-4	0	0	100	70-92	57-84	27-49	22-39	6-18
	13-24	Clay, clay loam	CL, CH	A-7-6	0	0	100	83-91	74-88	56-71	41-60	21-37
	24-33	Clay, clay loam	CH, CL	A-7-6	0	0	100	83-91	74-88	56-71	41-60	21-37
	33-49	Sandy clay	CH, CL	A-7-6	0	0	100	83-91	66-79	41-55	41-60	21-37
	49-60	Extremely paragravelly sandy clay loam	SC	A-6	0	0	100	100	83-88	43-50	32-43	14-22
123:												
Teapot------------------------	0-3	Very gravelly loam	GC, GM	A-2-6, A-2-7	0	0	55-72	32-51	26-47	18-35	31-46	11-17
	3-18	Extremely gravelly loam	GW, GP-GC	A-2-6	0	0	27-40	4-23	3-22	2-16	30-36	13-17
	18-61	Extremely gravelly loam	GW, GP-GC	A-2-6	0	0	27-40	4-23	3-22	2-16	29-35	13-17
Rock outcrop, diatomaceous mudstone----------------------	---	---	---	---	---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
127:												
Argixerolls	0-3	Gravelly sandy loam	SC-SM, SC	A-2-4	0	0	87-100	55-79	40-65	19-35	21-33	6-13
	3-12	Very gravelly sandy loam	SC-SM, SC	A-2-4	0	0	65-81	30-55	22-43	11-22	26-33	9-13
	12-21	Extremely gravelly sandy loam	SP-SC, SC	A-2-4	0	0	57-71	14-30	10-24	5-12	24-32	9-13
	21-28	Extremely gravelly sandy clay loam	SP-SC, SC	A-2-6	0	0	57-71	14-30	12-28	6-17	29-40	13-21
	28-32	Bedrock			---	---	---	---	---	---	---	---
Rock outcrop, rhyolite	---	---	---	---	---	---	---	---	---	---	---	---
Chalone	0-0.5	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	0.5-2	Sandy loam, gravelly loam, loam	CL, SC-SM	A-6, A-4	0	0	100	79-100	69-99	48-73	21-34	6-15
	2-5	Sandy loam, gravelly loam, loam	CL, SC-SM	A-6, A-4	0	0	100	79-100	69-99	48-73	21-34	6-15
	5-16	Very cobbly loam, extremely gravelly sandy loam, very gravelly sandy loam	SC	A-2-6	0	34-51	100	31-72	27-72	19-55	20-38	6-18
	16-20	Extremely gravelly sandy clay loam, extremely gravelly sandy loam	GC, GP	A-2-6, A-1-a	0	45-65	15-44	12-42	8-36	4-19	20-38	6-18
	20-21	Bedrock			---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
128:												
Still	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-9	Loamy coarse sand	SC-SM, SC	A-6, A-4	0	0	100	83-100	42-64	18-35	19-36	3-13
	9-21	Gravelly sandy loam	SM, CL	A-2-6, A-6	0	0-32	100	47-91	33-77	19-50	24-43	7-18
	21-31	Gravelly loam	CL, SC	A-7-6	0	0-33	100	45-90	33-80	24-61	33-51	13-25
	31-38	Gravelly coarse sandy loam	CL, SC	A-6	0	0-32	100	47-91	27-70	17-51	28-51	10-24
	38-47	Clay loam	CL, SC	A-7-6	0	0-35	100	43-90	36-87	31-77	39-55	19-28
	47-59	Silty clay loam	CL	A-7-6, A-6	0	0	100	90-100	78-100	71-94	35-50	17-28
	59-65	Clay loam	CL	A-7-6, A-6	0	0	100	90-100	75-99	63-86	35-50	17-28
Riverwash	---	---	---	---	---	---	---	---	---	---	---	---
131:												
Firstsister	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-8	Extremely channery loam	GP-GM, GM	A-2-4	0-14	0-28	25-63	7-54	6-50	4-37	18-39	2-13
	8-35	Extremely channery loam	GM, GP-GM	A-2-4	0-14	0-28	25-63	7-54	6-50	4-37	18-39	2-13
	35-59	Extremely channery coarse sandy loam	GC-GM	A-2-6, A-2-4	0-14	0-27	25-63	8-55	5-42	2-22	21-34	4-13
Oxyaquic Haploxerolls, frequently flooded	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-8	Fine sandy loam	SM	A-4, A-2-4	0	0	100	79-93	69-90	28-42	21-37	6-13
	8-35	Sandy loam	SC	A-2-6	0	0	86-93	72-85	52-66	26-34	24-32	9-13
	35-67	Extremely gravelly loamy coarse sand	SM, SP-SM, SP	A-1-a, A-1-b	6-24	7-28	39-85	12-78	6-46	2-20	0-23	NP-6
Rock outcrop, rhyolite or breccia	---	---	---	---	---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
132:												
Toags	0-3	Loamy sand, coarse sand	SM, GP-GM	A-2-4	0	0	57-93	53-92	40-77	12-30	0-43	NP-5
	3-7	Loamy sand, coarse sand	GP-GM, SM	A-2-4	0	0	57-93	53-92	40-77	12-30	0-32	NP-6
	7-24	Gravelly loamy coarse sand, loamy sand, gravelly loamy sand, coarse sand	GP-GM, SM	A-1-b	0	0	57-93	54-92	41-78	8-27	0-23	NP-6
	24-38	Loamy sand, gravelly loamy sand, gravelly loamy coarse sand, loamy sand, coarse sand	GP-GM, SM	A-2-4	0	0	57-93	54-92	42-79	10-32	0-23	NP-6
	38-60	Loamy sand, gravelly loamy sand, gravelly loamy coarse sand, loamy sand, coarse sand	GP-GM, SM	A-2-4	0	0	57-93	54-92	29-56	9-31	0-23	NP-6

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
132:												
Oxyaquic Haploxerolls, rarely flooded	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-5	Gravelly loamy coarse sand	SM	A-1-b, A-2-4	0	0	81-100	62-100	37-65	16-31	0-27	NP-4
	5-19	Extremely gravelly loamy coarse sand, very gravelly coarse sand	SP-SM, SM, SP	A-1-a, A-1-b	0	0	36-81	7-74	4-44	2-19	0-17	NP-1
	19-24	Fine sandy loam	SM	A-4, A-2-4	0	0	86-100	66-100	57-89	29-45	0-22	NP-2
	24-26	Sand, coarse sand	SP-SM	A-3, A-2-4	0	0	100	80-100	61-78	5-9	0-16	NP-1
	26-51	Sand, extremely gravelly loamy coarse sand, extremely gravelly coarse sand	SP-SM, SP	A-1-b, A-1-a, A-3, A-2-4	0	0-20	38-100	13-100	10-78	1-9	0-16	NP-1
Riverwash	---	---	---	---	---	---	---	---	---	---	---	---
133:												
Toags	0-7	Loamy sand, gravelly coarse sand	SM, GP-GM	A-2-4	0	0	57-93	53-92	22-45	7-22	0-43	NP-5
	7-24	Coarse sand, gravelly coarse sand	GP-GM, SM	A-2-4	0	0	57-93	53-92	27-54	7-22	0-32	NP-6
	24-42	Gravelly coarse sand, loamy sand, gravelly loamy sand	GP-GM, SM	A-1	0	0	57-93	53-92	25-51	6-20	0-23	NP-6
	42-60	Loamy sand, gravelly coarse sand, gravelly loamy coarse sand, loamy sand	GP-GM, SM	A-1	0	0	57-93	53-92	25-50	5-19	0-23	NP-6

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
133:												
Pinncamp-----------------------	0-2	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	2-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-12	Loamy sand, gravelly coarse sand	SM, GP-GM	A-2-4	0	0	57-93	53-92	27-54	7-23	0-43	NP-5
	12-22	Gravelly loamy coarse sand, gravelly loamy sand	GP-GM, SM	A-2-4	0	0	57-93	53-92	29-57	9-25	0-43	NP-5
	22-36	Gravelly loamy coarse sand, loamy coarse sand, gravelly loamy sand	GP-GM, SM	A-1-b	0	0	57-93	53-92	39-76	10-27	0-32	NP-6
	36-64	Gravelly loamy coarse sand, gravelly loamy sand, loamy coarse sand	GP-GM, SM	A-2-4	0	0	52-93	48-92	25-55	9-27	0-32	NP-6
134:												
Toags--------------------------	0-5	Loamy sand, gravelly loamy sand, gravelly coarse sand	SM, GP-GM	A-2-4	0	0	57-93	53-92	28-56	9-31	0-43	NP-5
	5-61	Loamy sand, gravelly loamy sand, gravelly loamy coarse sand, loamy sand, gravelly coarse sand	GP-GM, SM	A-2-4	0	0	57-93	53-92	28-56	9-31	0-23	NP-6

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
135:												
Toags	0-7	Loamy sand, gravelly loamy sand	SM, GP-GM	A-2-4	0	0	57-93	53-92	40-77	12-30	0-43	NP-5
	7-24	Loamy sand, gravelly loamy sand	GP-GM, SM	A-2-4	0	0	57-93	53-92	40-77	12-30	0-32	NP-6
	24-42	Gravelly loamy coarse sand, loamy sand, gravelly loamy sand	GP-GM, SM	A-1-b	0	0	57-93	53-92	40-76	10-26	0-23	NP-6
	42-60	Loamy sand, gravelly loamy sand, gravelly loamy coarse sand, loamy sand	GP-GM, SM	A-2-4	0	0	57-93	53-92	40-77	12-30	0-23	NP-6
Riverwash	---	---	---	---	---	---	---	---	---	---	---	---
136:												
Oxyaquic Haploxerolls, ponded	0-4	Clay	CH, CL	A-7-6	0	0	100	83-100	70-95	56-78	46-61	25-32
	4-20	Clay, silty clay loam, gravelly sandy loam	CL, CH	A-7-6, A-6	0	0	92-100	75-100	49-95	36-78	27-61	10-32
	20-35	Gravelly sandy clay loam, silty clay loam	CL	A-7-6	0	0	100	69-100	57-86	32-51	39-45	21-24
	35-47	Clay loam	CL	A-7-6	0	0	100	76-100	69-96	55-77	40-49	21-25
	47-49	Coarse sandy loam, very gravelly loamy coarse sand	SC-SM, SM, SP-SM	A-2-4, A-1-a, A-1-b	0	0	82-100	32-100	18-63	10-37	0-23	NP-6
	49-59	Loam, gravelly coarse sandy loam	SC-SM, CL-ML	A-4, A-1-b, A-2-4, A-2-6, A-6	0	0	81-100	32-100	23-89	15-65	0-33	NP-14
138:												
Rock outcrop, rhyolite or breccia	---	---	---	---	---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
138:												
Highpeaks	0-4	Very gravelly loam	SC	A-2-4, A-2-6	0	8-48	100	33-91	29-91	18-66	23-40	7-18
	4-11	Very gravelly loam	SC, SP	A-2-4, A-2-6	0	8-48	54-91	8-83	7-83	4-60	23-40	7-18
	11-15	Very gravelly loam	SC, SP	A-2-4, A-2-6	0	8-48	54-91	8-83	7-83	4-60	23-40	7-18
	15-16	Bedrock			---	---	---	---	---	---	---	---
Chalone	0-4	Gravelly loam, gravelly sandy loam	SC, SC-SM	A-6	0	7-14	92-93	63-78	52-74	36-54	21-34	6-15
	4-13	Very gravelly loam, extremely gravelly sandy clay loam	SC, SC-SM	A-6, A-2-6	0	7-28	77-93	39-70	29-63	21-48	20-38	6-18
	13-24	Extremely gravelly sandy loam, extremely gravelly sandy clay loam	GP, GC	A-2-6, A-1-a	0	7-14	35-55	11-36	8-30	3-17	20-38	6-18
	24-28	Bedrock			---	---	---	---	---	---	---	---
139:												
Highpeaks	0-3	Gravelly sandy loam	SC, SP-SC	A-2-4, A-2-6	0	0	60-92	20-84	14-69	7-39	23-32	7-12
	3-10	Gravelly loam	SC, SP-SC	A-2-4, A-2-6	0	0	60-92	20-84	17-84	11-60	23-40	7-18
	10-15	Extremely gravelly loam	SC, SP-SC	A-2-4, A-2-6	0	0	60-92	20-84	17-84	11-60	23-40	7-18
	15-16	Bedrock			---	---	---	---	---	---	---	---
Rock outcrop, rhyolitic breccia	---	---	---	---	---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				*Pct*	*Pct*					*Pct*	
142:												
Ordeal	0-6	Loamy sand	SC-SM, SM	A-2-4	0	0	100	71-97	56-79	20-32	0-25	NP-6
	6-14	Loamy sand, gravelly coarse sand, loamy coarse sand, coarse sandy loam, sandy loam	SM, SC-SM	A-2-4	0	0	100	71-97	54-81	18-35	0-25	NP-6
	14-23	Gravelly loamy sand, loamy sand, loamy coarse sand, extremely gravelly loamy sand	SC-SM, SM	A-2-4	0	0	61-70	53-64	42-52	16-21	16-22	2-6
	23-36	Extremely gravelly loamy sand	SC-SM, SM	A-2-4, A-1-b, A-1-a	0	29-41	43-77	31-72	24-59	9-24	0-23	NP-6
	36-40	Bedrock			---	---	---	---	---	---	---	---
Longsfolly	0-4	Loamy sand, gravelly loamy sand	SM, GP-GM	A-2-4	0	0	57-93	53-92	40-77	12-30	0-43	NP-5
	4-16	Loamy sand, gravelly loamy sand	GP-GM, SM	A-2-4	0	0	57-93	53-92	40-77	12-30	0-43	NP-5
	16-28	Gravelly loamy coarse sand, loamy sand, gravelly loamy sand	GP-GM, SM	A-1-b	0	0	57-93	53-92	27-55	9-22	0-32	NP-6
	28-50	Loamy sand, gravelly loamy sand, gravelly loamy coarse sand	GP-GM, SM	A-2-4	0	0	52-93	47-92	36-77	10-30	0-32	NP-6
	50-63	Bedrock			---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
142:												
Passion------------------------	0-3	Gravelly loamy sand	SC-SM	A-1-b, A-2-4	0	0	100	53-77	40-65	14-27	0-27	NP-6
	3-7	Gravelly loamy sand	SC-SM	A-1-b, A-2-4	0	0	100	53-92	40-77	14-32	0-27	NP-6
	7-16	Very gravelly loamy sand	SP-SM, SC-SM	A-1-a, A-1-b	0	0	73-76	33-53	25-44	7-16	0-22	NP-6
	16-61	Very gravelly loamy sand	SP-SM, SC-SM	A-1-a, A-1-b, A-2-4	0	0	74-100	33-92	25-77	9-32	0-22	NP-6
146:												
Badlands, scarps *in* conglomerate------------------	---	---	---	---	---	---	---	---	---	---	---	---
148:												
Backdoor-----------------------	0-5	Loam	CL-ML, CL, SC-SM, SC	A-6, A-4	0	0	80-93	76-91	58-86	40-64	20-39	4-18
	5-10	Gravelly loam, sandy loam	CL	A-6	0	0	80-93	76-91	61-82	44-62	26-39	9-18
	10-15	Gravelly clay loam	SC, CL	A-7-6, A-2-6, A-6, A-2-7	0	0	45-93	35-91	28-85	21-67	31-46	13-25
	15-27	Very paragravelly sandy clay loam	SC, CL	A-7-6, A-6	0	0	100	100	82-97	45-60	31-46	13-25
	27-60	Extremely paragravelly loamy coarse sand	SC-SM	A-2-4	0	0	100	100	56-61	24-29	16-23	2-6

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
148:												
Tuborcio	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	1-2	Sandy loam	SC, SC-SM	A-2-4	0	0	100	70-92	53-73	27-41	22-34	6-14
	2-8	Sandy clay loam, coarse sandy loam, sandy loam, loam	SC-SM, SC	A-2-4	0	0	100	70-92	57-85	27-52	22-39	6-18
	8-13	Sandy clay, clay loam	CL, CH	A-7-6	0	0	100	83-91	65-83	42-61	41-60	21-37
	13-28	Sandy clay, clay loam	CH, CL	A-7-6	0	0	100	83-91	65-83	42-61	41-60	21-37
	28-50	Sandy clay, clay loam	CH, CL	A-7-6	0	0	100	83-91	65-83	42-61	41-60	21-37
	50-60	Extremely paragravelly sandy clay loam	SC	A-6	0	0	100	100	84-89	46-52	34-43	15-22
152:												
Backdoor	0-2	Sandy loam	SC-SM, SC	A-6, A-4	0	0	80-93	77-92	51-72	27-44	20-33	4-13
	2-6	Sandy loam		A-6	0	0	80-93	77-92	53-72	29-44	21-33	6-13
	6-11	Sandy clay loam	SC, CL	A-7-6, A-6	0	0	100	100	82-97	48-63	31-46	13-25
	11-22	Gravelly sandy clay loam	SC, CL	A-7-6, A-6	0	0	100	100	82-97	48-63	31-46	13-25
	22-27	Very paragravelly sandy clay	CL, CH	A-7-6	0	0	100	100	78-83	48-53	45-52	25-29
	27-60	Extremely paragravelly loamy coarse sand	SC, SC-SM	A-2-4	0	0	100	100	56-66	24-34	16-27	2-10

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
155:												
Chalone	0-3	Very gravelly sandy loam	SC	A-1-a, A-2-6, A-2-4	7-14	14-27	41-76	40-75	28-60	14-32	21-31	6-12
	3-8	Very gravelly sandy loam	GC, SC	A-1-a, A-2-6, A-2-4	7-14	14-27	43-76	41-75	29-60	14-32	21-31	6-12
	8-20	Very gravelly coarse sandy loam	GC, GP-GC, GC-GM	A-2-6, A-1-a	0	0	36-50	34-49	21-33	12-20	20-32	6-12
	20-23	Gravelly sandy clay loam	SC	A-2-6, A-6	0	0	55-73	54-72	43-65	24-38	29-42	13-21
	23-24	Bedrock			---	---	---	---	---	---	---	---
Knuckle	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	1-4	Gravelly sandy loam	SM	A-1-b	0	0	93-94	56-79	43-65	23-37	17-23	2-6
	4-7	Very gravelly loamy sand	SW-SM, SP-SM	A-2-4, A-1-b	0	0	55-86	27-73	20-61	7-25	0-22	NP-6
	7-8	Bedrock			---	---	---	---	---	---	---	---
Rock outcrop, rhyolite	---	---	---	---	---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
156:												
Chalone------------------------	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	1-4	Sandy loam, gravelly loam, loam	CL, SC-SM	A-6, A-4	0	0	93-100	72-100	60-95	42-70	21-34	6-15
	4-13	Gravelly sandy clay loam, very gravelly loam, gravelly loam	SC-SM, SC, CL	A-6, A-2-4	0	0	80-100	54-78	41-70	29-53	20-38	6-18
	13-22	Extremely gravelly sandy clay loam, extremely gravelly sandy loam	GC, SW-SC, GP	A-2-6, A-1-a	0	0	48-57	6-39	4-32	2-18	20-38	6-18
	22-38	Extremely gravelly sandy clay loam, extremely gravelly sandy loam, very gravelly sandy loam	SP-SC, SC	A-2-6, A-1-a	0	0	76-93	34-60	23-50	10-27	20-38	6-18
	38-41	Bedrock			---	---	---	---	---	---	---	---
Knuckle------------------------	0-2	Loamy sand	SM	A-2-4	0	0	81-86	81-86	63-72	22-29	0-21	NP-4
	2-8	Very gravelly loamy sand	GP-GM, GM	A-1-b	0	0	38-57	36-56	28-47	10-19	0-20	NP-4
	8-12	Extremely stony loamy sand	GP-GM	A-1-b	49-54	14-33	24-63	21-61	17-51	6-21	0-20	NP-4
	12-23	Bedrock			---	---	---	---	---	---	---	---
Firstsister--------------------	0-4	Extremely gravelly sandy loam	GP-GM, GM	A-2-4	0	0	30-63	14-54	10-45	5-24	18-35	2-10
	4-31	Extremely gravelly sandy loam	GC-GM, GC	A-1-a	0	0	30-63	14-55	11-45	5-25	21-31	4-10
	31-59	Extremely gravelly sandy loam	GC-GM, GC	A-1-a	0	0	30-63	14-55	11-46	5-25	21-31	4-10

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
PgE:												
Pinnacles	0-4	Coarse sandy loam	SC-SM	A-2-6, A-2-4	0	7-32	55-94	44-93	26-63	14-39	21-33	6-13
	4-10	Gravelly sandy loam	SC-SM	A-2-4, A-4	0	7-32	55-94	44-93	32-76	16-42	21-33	6-13
	10-17	Gravelly sandy loam	SC-SM	A-2-4, A-4	0	7-32	55-94	44-93	32-76	16-42	21-33	6-13
	17-23	Gravelly clay loam	GC	A-2-7, A-7-6	0	7-34	53-93	42-92	35-84	27-67	37-46	19-25
	23-30	Gravelly clay	GC	A-2-7, A-7-6	0	7-35	52-93	41-92	38-88	30-72	49-56	29-33
	30-36	Bedrock			---	---	---	---	---	---	---	---
PhG2:												
Pinnacles	0-4	Stony sandy loam	SC-SM	A-2-4, A-2-6	20	7-32	46-93	33-91	24-75	12-41	21-33	6-13
	4-10	Gravelly sandy loam	SC-SM	A-2-4, A-4	0	7-32	55-94	44-93	32-76	16-42	21-33	6-13
	10-17	Gravelly sandy loam	SC-SM	A-2-4, A-4	0	7-32	55-94	44-93	32-76	16-42	21-33	6-13
	17-23	Gravelly clay loam	GC	A-2-7, A-7-6	0	7-34	53-93	42-92	35-84	27-67	37-46	19-25
	23-30	Gravelly clay	GC	A-2-7, A-7-6	0	7-35	52-93	41-92	38-88	30-72	49-56	29-33
	30-36	Bedrock			---	---	---	---	---	---	---	---
PnE2:												
Pinnacles	0-8	Coarse sandy loam	SC-SM	A-2-4, A-4	0	0	92-100	79-100	46-68	26-43	21-33	6-13
	8-12	Coarse sandy loam, sandy loam	SC-SM	A-4	0	0	91-100	83-100	52-73	36-54	20-32	6-13
	12-25	Sandy clay, clay loam, clay	CH, SC	A-7-6	0	0	91-100	82-100	61-94	37-65	45-64	25-40
	25-60	Weathered bedrock		A-7	---	---	---	---	---	---	---	---

Table 12.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
PnG3:												
Pinnacles----------------------	0-8	Coarse sandy loam	SC-SM	A-2-4, A-4	0	0	92-100	79-100	46-68	26-43	21-33	6-13
	8-12	Coarse sandy loam, sandy loam	SC-SM	A-4	0	0	91-100	83-100	52-73	36-54	20-32	6-13
	12-25	Sandy clay, clay loam, clay	CH, SC	A-7-6	0	0	91-100	82-100	61-94	37-65	45-64	25-40
	25-60	Weathered bedrock		A-7	---	---	---	---	---	---	---	---
SdG3:												
Santa Lucia--------------------	0-4	Channery loam	CL, CH	A-6	0	0	100	100	85-94	62-71	31-58	11-18
	4-14	Very parachannery loam	CL, CH	A-6, A-7-5, A-7-6	0	0	100	100	85-94	62-71	31-58	11-18
	14-18	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 13.--Physical Properties of the Soils

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter
	In	*Pct*	*g/cc*	*um/sec*	*In/in*	*Pct*	*Pct*
101:							
Ordeal	0-5	2-10	1.50-1.60	14.11-42.34	0.10-0.14	0.0-2.9	0.5-1.8
	5-16	2-10	1.55-1.65	42.34-141.14	0.03-0.06	0.0-1.0	0.5-1.8
	16-21	2-10	1.50-1.60	14.11-42.34	0.03-0.05	0.0-2.9	0.0-0.5
	21-25	---	---	---	---	---	---
Passion	0-3	2-10	1.55-1.65	42.00-141.00	0.07-0.09	0.0-1.0	1.0-3.0
	3-8	2-10	1.55-1.65	42.00-141.00	0.07-0.09	0.0-1.0	1.0-3.0
	8-13	2-10	1.60-1.70	42.34-141.14	0.05-0.07	0.0-1.0	0.0-0.5
	13-61	2-10	1.55-1.65	42.00-141.00	0.05-0.07	0.0-1.0	0.0-0.5
Badlands	---	---	---	---	---	---	---
104:							
Knuckle	0-6	2-8	1.55-1.65	42.34-141.14	0.04-0.09	0.0-1.0	0.5-1.0
	6-17	2-8	1.55-1.65	42.34-141.14	0.01-0.05	0.0-1.0	0.0-0.5
	17-20	2-8	1.55-1.65	42.34-141.14	0.01-0.05	0.0-1.0	0.0-0.5
	20-21	---	---	---	---	---	---
Burgundy	0-1	10-15	1.50-1.60	4.23-14.11	0.03-0.08	0.0-3.0	1.0-6.0
	1-6	10-15	1.50-1.60	4.23-14.11	0.03-0.08	0.0-3.0	1.0-6.0
	6-7	---	---	---	---	---	---
Argixerolls	0-4	10-16	1.50-1.60	4.23-14.11	0.08-0.12	0.0-2.9	0.5-1.0
	4-10	18-22	1.45-1.55	4.23-14.11	0.07-0.13	0.0-2.9	0.5-1.0
	10-27	15-30	1.40-1.60	1.41-4.23	0.02-0.11	0.0-5.9	0.0-0.5
	27-31	---	---	---	---	---	---
105:							
Chalone	0-3	5-10	1.50-1.60	14.11-42.34	0.05-0.12	0.0-3.0	0.5-1.0
	3-8	10-18	1.45-1.70	4.23-14.11	0.01-0.12	0.0-3.0	0.0-0.5
	8-20	10-18	1.45-1.70	4.23-14.11	0.01-0.12	0.0-3.0	0.0-0.5
	20-33	---	---	---	---	---	---
Firstsister	0-1	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	1-5	5-18	1.45-1.60	14.11-42.34	0.02-0.11	0.0-3.0	1.0-4.0
	5-22	5-18	1.45-1.60	14.11-42.34	0.02-0.11	0.0-3.0	1.0-4.0
	22-59	5-10	1.45-1.60	14.11-42.34	0.02-0.09	0.0-3.0	1.0-2.0
Highpeaks	0-2	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	2-5	12-18	1.30-1.42	4.23-14.11	0.10-0.15	0.0-1.0	0.5-2.0
	5-13	12-18	1.30-1.42	4.23-14.11	0.07-0.10	0.0-1.0	0.5-2.0
	13-21	---	---	---	---	---	---
	21-22	---	---	---	---	---	---
106:							
Casino	0-4	18-27	1.40-1.55	0.42-1.41	0.13-0.20	6.0-9.0	1.0-3.0
	4-10	30-38	1.40-1.55	0.42-1.41	0.13-0.20	6.0-9.0	1.0-3.0
	10-20	38-60	1.35-1.50	0.42-1.41	0.13-0.21	6.0-9.0	0.5-1.0
	20-37	38-60	1.35-1.50	0.07-0.42	0.13-0.21	6.0-9.0	0.5-1.0
	37-38	---	---	---	---	---	---
Argixerolls	0-2	15-35	1.45-1.55	4.23-14.11	0.07-0.16	3.0-5.9	0.5-1.0
	2-6	25-60	1.35-1.55	0.42-1.41	0.02-0.16	3.0-8.9	0.0-0.5
	6-7	30-50	1.35-1.50	0.42-1.41	0.03-0.21	3.0-8.9	0.0-0.5
	7-11	---	---	---	---	---	---
107:							
Casino	0-1	20-35	1.40-1.55	4.23-14.11	0.11-0.18	6.0-9.0	1.0-3.0
	1-7	20-35	1.40-1.55	4.23-14.11	0.13-0.20	6.0-9.0	1.0-3.0
	7-12	35-40	1.35-1.50	0.42-1.41	0.13-0.21	6.0-9.0	0.5-1.0
	12-21	35-40	1.35-1.50	0.42-1.41	0.13-0.21	6.0-9.0	0.5-1.0
	21-31	40-60	1.35-1.50	0.07-0.42	0.13-0.21	6.0-9.0	0.5-1.0
	31-33	---	---	---	---	---	---

Table 13.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
109:							
Rock outcrop, pinnacles of rhyolitic breccia-----------	---	---	---	---	---	---	---
Highpeaks--------------------	0-3	12-18	1.30-1.42	4.23-14.11	0.10-0.15	0.0-1.0	0.5-2.0
	3-8	12-18	1.30-1.42	4.23-14.11	0.07-0.10	0.0-1.0	0.5-2.0
	8-15	12-18	1.30-1.42	4.23-14.11	0.07-0.10	0.0-1.0	0.5-2.0
	15-16	---	---	---	---	---	---
Burgundy---------------------	0-1	10-15	1.50-1.60	4.23-14.11	0.03-0.08	0.0-3.0	1.0-6.0
	1-6	10-15	1.50-1.60	4.23-14.11	0.03-0.08	0.0-3.0	1.0-6.0
	6-8	---	---	---	---	---	---
110:							
Knuckle----------------------	0-3	2-10	1.55-1.65	14.11-42.34	0.04-0.09	0.0-2.9	0.5-1.0
	3-12	2-8	1.55-1.65	42.34-141.14	0.01-0.05	0.0-2.9	0.0-0.5
	12-17	2-8	1.55-1.65	42.34-141.14	0.01-0.05	0.0-2.9	0.0-0.5
	17-23	---	---	---	---	---	---
Chalone----------------------	0-1	0-0	0.05-0.30	42.00-141.00	0.45-0.55	---	30-70
	1-3	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	3-8	10-18	1.50-1.60	4.23-14.11	0.05-0.12	0.0-3.0	0.5-1.0
	8-12	22-30	1.45-1.70	4.23-14.11	0.01-0.12	0.0-3.0	0.0-0.5
	12-30	22-30	1.45-1.70	4.23-14.11	0.01-0.12	0.0-3.0	0.0-0.5
	30-34	---	---	---	---	---	---
Burgundy---------------------	0-2	10-15	1.50-1.60	4.23-14.11	0.03-0.08	0.0-3.0	5.0-10
	2-5	10-15	1.50-1.60	4.23-14.11	0.03-0.08	0.0-3.0	1.0-6.0
	5-6	---	---	---	---	---	---
111:							
Backdoor sandy loam----------	0-5	8-25	1.45-1.60	4.23-14.11	0.09-0.17	0.0-6.0	0.5-1.0
	5-10	18-25	1.45-1.60	4.23-14.11	0.09-0.17	0.0-6.0	0.5-1.0
	10-15	20-35	1.40-1.55	1.41-4.23	0.07-0.20	3.0-6.0	0.0-0.5
	15-27	20-35	1.40-1.55	4.23-14.11	0.07-0.20	3.0-6.0	0.0-0.5
	27-60	5-20	1.50-1.70	42.34-141.14	0.04-0.13	0.0-1.0	0.0-0.5
Backdoor gravelly sandy loam	0-4	8-25	1.45-1.60	4.23-14.11	0.09-0.17	0.0-6.0	0.5-1.0
	4-17	20-35	1.40-1.55	1.41-4.23	0.07-0.20	3.0-6.0	0.0-0.5
	17-28	20-35	1.40-1.55	4.23-14.11	0.07-0.20	3.0-6.0	0.0-0.5
	28-60	0-10	1.50-1.70	42.34-141.14	0.04-0.13	0.0-3.0	0.0-0.5
Tuborcio---------------------	0-3	10-18	1.45-1.60	14.11-42.34	0.08-0.17	3.0-6.0	0.2-1.0
	3-14	10-18	1.45-1.60	14.11-42.34	0.08-0.17	3.0-6.0	0.2-1.0
	14-21	10-18	1.45-1.60	14.11-42.34	0.08-0.17	3.0-6.0	0.2-1.0
	21-28	40-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	28-33	40-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	33-41	20-35	1.45-1.55	4.23-14.11	0.01-0.04	6.0-9.0	0.0-0.1
112:							
Rimtrail---------------------	0-2	14-18	1.45-1.60	4.23-14.11	0.11-0.13	0.0-1.0	5.0-10
	2-11	14-18	1.45-1.60	4.23-14.11	0.11-0.13	0.0-1.0	5.0-10
	11-22	14-18	1.45-1.60	4.23-14.11	0.11-0.13	0.0-1.0	5.0-10
	22-29	25-38	1.40-1.55	1.40-4.23	0.19-0.21	0.0-2.9	0.5-2.0
	29-45	25-38	1.40-1.55	1.40-4.23	0.19-0.21	0.0-2.9	0.5-2.0
	45-59	25-38	1.40-1.55	1.40-4.23	0.19-0.21	0.0-2.9	0.5-2.0
113:							
Elder------------------------	0-0.5	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	0.5-3	10-12	1.50-1.60	14.11-42.34	0.09-0.15	0.0-3.0	1.0-3.0
	3-20	12-15	1.45-1.60	4.23-14.11	0.08-0.18	0.0-3.0	1.0-3.0
	20-22	10-15	1.55-1.70	14.11-42.34	0.04-0.10	0.0-3.0	0.0-1.0
	22-44	10-15	1.50-1.60	14.11-42.34	0.05-0.11	0.0-3.0	0.0-1.0
	44-56	5-15	1.60-1.70	42.34-141.14	0.01-0.06	0.0-3.0	0.0-1.0

Table 13.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity (K_{sat})	Available water capacity	Linear extensi- bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
113:							
Oxyaquic Haploxerolls, rarely flooded	0-2	3-15	1.50-1.60	14.11-42.34	0.07-0.13	0.0-2.9	0.5-3.0
	2-11	3-15	1.50-1.60	14.11-42.34	0.07-0.13	0.0-2.9	0.5-3.0
	11-14	3-20	1.55-1.70	42.34-141.14	0.02-0.06	0.0-2.9	0.5-3.0
	14-26	3-20	1.50-1.60	14.11-42.34	0.03-0.10	0.0-2.9	0.5-3.0
	26-33	3-20	1.55-1.70	14.11-42.34	0.02-0.06	0.0-2.9	0.5-3.0
	33-37	3-20	1.55-1.60	14.11-42.34	0.03-0.10	0.0-2.9	0.5-3.0
	37-59	1-20	1.55-1.70	14.11-42.34	0.02-0.06	0.0-2.9	0.0-0.5
114:							
Ordeal	0-13	5-15	1.55-1.60	14.11-42.34	0.09-0.12	0.0-2.9	0.5-1.8
	13-30	5-10	1.60-1.70	42.34-141.14	0.03-0.05	0.0-1.0	0.0-5.0
	30-33	---	---	---	---	---	---
Tuborcio	0-13	10-18	1.45-1.60	4.23-14.11	0.08-0.17	3.0-6.0	0.2-1.0
	13-17	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	17-24	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	24-40	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	40-60	20-30	1.45-1.55	4.23-14.11	0.01-0.04	6.0-9.0	0.0-0.1
Passion	0-5	2-10	1.55-1.65	42.34-141.14	0.06-0.09	0.0-1.0	1.0-3.0
	5-11	2-10	1.55-1.65	42.00-141.00	0.05-0.08	0.0-1.0	1.0-3.0
	11-17	2-10	1.55-1.65	42.00-141.00	0.03-0.06	0.0-1.0	0.5-1.0
	17-21	---	---	---	---	---	---
115:							
Tuborcio	0-4	10-20	1.45-1.60	4.23-14.11	0.08-0.17	3.0-6.0	0.2-1.0
	4-14	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	14-20	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	20-29	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	29-45	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	45-60	20-30	1.45-1.55	4.23-14.11	0.01-0.04	6.0-9.0	0.0-0.1
117:							
Elder	0-3	7-15	1.50-1.60	4.23-14.11	0.07-0.13	0.0-3.0	1.0-3.0
	3-12	7-15	1.50-1.60	4.23-14.11	0.07-0.13	0.0-3.0	1.0-3.0
	12-24	7-15	1.50-1.60	4.23-14.11	0.07-0.13	0.0-3.0	1.0-3.0
	24-33	3-15	1.50-1.70	42.34-141.14	0.03-0.12	0.0-3.0	0.0-0.5
	33-36	20-35	1.40-1.55	4.23-14.11	0.09-0.17	3.0-6.0	1.0-2.0
	36-43	3-15	1.50-1.70	42.34-141.14	0.03-0.12	0.0-3.0	0.0-0.5
	43-45	20-35	1.40-1.55	0.42-1.41	0.09-0.17	3.0-6.0	1.0-2.0
	45-61	3-15	1.50-1.70	42.34-141.14	0.03-0.12	0.0-3.0	0.0-0.5
119:							
Still	0-4	40-45	1.35-1.45	0.42-1.41	0.15-0.17	6.0-8.9	1.0-3.0
	4-20	40-45	1.35-1.45	0.42-1.41	0.15-0.17	6.0-8.9	1.0-3.0
	20-35	27-35	1.40-1.50	1.40-4.23	0.14-0.19	3.0-5.9	1.0-3.0
	35-59	18-27	1.45-1.55	4.23-14.11	0.15-0.18	0.0-2.9	0.0-0.5
120:							
Elder	0-3	0-18	1.55-1.60	14.11-42.34	0.08-0.12	0.0-3.0	1.0-3.0
	3-24	0-18	1.50-1.60	14.11-42.34	0.08-0.13	0.0-3.0	1.0-3.0
	24-33	0-18	1.50-1.60	4.23-14.11	0.08-0.13	0.0-3.0	0.0-1.0
	33-53	0-18	1.60-1.70	42.34-141.14	0.04-0.07	0.0-3.0	0.0-1.0
	53-59	15-27	1.45-1.55	4.23-14.11	0.12-0.18	3.0-6.0	0.0-2.0
122:							
Tuborcio	0-3	10-20	1.45-1.60	4.23-14.11	0.08-0.17	3.0-6.0	0.2-1.0
	3-13	10-25	1.45-1.60	4.23-14.11	0.08-0.17	3.0-6.0	0.2-1.0
	13-24	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	24-33	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	33-49	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	49-60	20-30	1.45-1.55	4.23-14.11	0.01-0.04	6.0-9.0	0.0-0.1
123:							
Teapot	0-3	18-25	1.45-1.55	4.23-14.11	0.07-0.09	0.0-1.0	2.0-6.0
	3-18	20-25	1.45-1.55	4.23-14.11	0.07-0.09	0.0-1.0	0.5-1.0
	18-61	20-25	1.45-1.55	4.23-14.11	0.05-0.07	0.0-1.0	0.1-0.5

Table 13.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
123:							
Rock outcrop, diatomaceous mudstone	---	---	---	---	---	---	---
127:							
Argixerolls	0-3	10-20	1.50-1.60	4.23-14.11	0.08-0.12	0.0-2.9	0.5-1.0
	3-12	15-20	1.50-1.60	4.23-14.11	0.05-0.09	0.0-2.9	0.5-1.0
	12-21	15-20	1.50-1.60	4.23-14.11	0.02-0.06	0.0-2.9	0.0-0.5
	21-28	20-30	1.45-1.55	4.23-14.11	0.07-0.14	0.0-2.9	0.0-0.5
	28-32	---	---	---	---	---	---
Rock outcrop, rhyolite	---	---	---	---	---	---	---
Chalone	0-0.5	0-0	0.05-0.30	42.00-141.00	0.45-0.55	---	30-70
	0.5-2	10-22	1.50-1.60	4.23-14.11	0.17-0.19	0.0-3.0	0.5-1.0
	2-5	10-22	1.50-1.60	4.23-14.11	0.17-0.19	0.0-3.0	0.5-1.0
	5-16	10-25	1.45-1.70	4.23-14.11	0.05-0.12	0.0-6.0	0.0-0.5
	16-20	10-25	1.45-1.70	4.23-14.11	0.01-0.12	0.0-6.0	0.0-0.5
	20-21	---	---	---	---	---	---
128:							
Still	0-3	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	3-9	6-20	1.40-1.60	14.11-42.34	0.11-0.14	0.0-1.0	1.0-3.0
	9-21	12-27	1.40-1.55	4.23-14.11	0.11-0.18	0.0-2.9	1.0-3.0
	21-31	20-35	1.30-1.50	1.41-4.23	0.10-0.18	3.0-5.9	1.0-3.0
	31-38	15-35	1.40-1.50	1.41-4.23	0.10-0.18	3.0-5.9	1.0-3.0
	38-47	27-40	1.20-1.50	1.40-4.23	0.10-0.18	3.0-5.9	1.0-3.0
	47-59	25-40	1.20-1.55	1.41-4.23	0.16-0.21	3.0-5.9	0.0-0.5
	59-65	25-40	1.20-1.55	1.41-4.23	0.16-0.21	3.0-5.9	0.0-0.5
Riverwash	---	---	---	---	---	---	---
131:							
Firstsister	0-2	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	2-8	5-20	1.45-1.60	4.23-14.11	0.02-0.11	0.0-3.0	1.0-4.0
	8-35	5-20	1.45-1.60	4.23-14.11	0.02-0.11	0.0-3.0	1.0-4.0
	35-59	8-19	1.45-1.60	4.23-14.11	0.02-0.09	0.0-3.0	1.0-2.0
Oxyaquic Haploxerolls, frequently flooded	0-4	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	4-8	10-20	1.50-1.60	4.23-14.11	0.11-0.14	0.0-2.9	0.5-3.0
	8-35	15-20	1.50-1.60	4.23-14.11	0.09-0.12	0.0-2.9	0.0-0.5
	35-67	2-10	1.60-1.70	42.34-141.14	0.01-0.03	0.0-2.9	0.0-0.5
Rock outcrop, rhyolite or breccia	---	---	---	---	---	---	---
132:							
Toags	0-3	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	5.0-10
	3-7	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	2.0-5.0
	7-24	2-10	1.55-1.70	42.34-141.14	0.05-0.07	0.0-1.0	0.5-1.0
	24-38	2-10	1.55-1.70	42.34-141.14	0.05-0.07	0.0-1.0	0.5-1.0
	38-60	2-10	1.55-1.70	141.14-423.30	0.05-0.07	0.0-1.0	0.5-1.0
Oxyaquic Haploxerolls, rarely flooded	0-2	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	2-5	3-8	1.60-1.70	42.34-141.14	0.04-0.07	0.0-2.9	0.1-3.0
	5-19	1-3	1.60-1.80	42.34-141.14	0.01-0.05	0.0-2.9	0.0-0.5
	19-24	3-5	1.50-1.60	14.11-42.34	0.09-0.15	0.0-2.9	0.1-2.0
	24-26	1-3	1.60-1.70	42.34-141.14	0.01-0.08	0.0-1.0	0.0-0.5
	26-51	1-3	1.60-1.70	42.34-141.14	0.04-0.08	0.0-1.0	0.0-0.5
Riverwash	---	---	---	---	---	---	---
133:							
Toags	0-7	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	5.0-10
	7-24	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	2.0-5.0
	24-42	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	0.5-1.0
	42-60	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	0.5-1.0

Table 13.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter
	In	*Pct*	*g/cc*	*um/sec*	*In/in*	*Pct*	*Pct*
133:							
Pinncamp----------------------	0-2	0-0	0.05-0.30	42.00-141.00	0.45-0.55	---	30-70
	2-4	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	4-12	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	5.0-10
	12-22	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	5.0-10
	22-36	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	2.0-5.0
	36-64	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	2.0-5.0
134:							
Toags-------------------------	0-5	2-10	1.55-1.80	141.14-423.30	0.07-0.09	0.0-1.0	5.0-10
	5-61	2-10	1.55-1.80	141.14-423.30	0.05-0.07	0.0-1.0	0.5-1.0
135:							
Toags-------------------------	0-7	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	5.0-10
	7-24	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	2.0-5.0
	24-42	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	0.5-1.0
	42-60	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	0.5-1.0
Riverwash---------------------	---	---	---	---	---	---	---
136:							
Oxyaquic Haploxerolls, ponded	0-4	35-45	1.35-1.45	0.42-1.41	0.13-0.16	6.0-8.9	0.5-3.0
	4-20	15-45	1.35-1.60	0.42-1.41	0.09-0.21	3.0-8.9	0.5-3.0
	20-35	30-34	1.45-1.55	1.40-4.23	0.11-0.21	3.0-5.9	0.0-0.5
	35-47	30-35	1.40-1.50	1.40-4.23	0.15-0.21	3.0-5.9	0.5-2.0
	47-49	3-10	1.55-1.70	4.23-14.11	0.03-0.09	0.0-2.9	0.0-0.5
	49-59	3-20	1.45-1.60	4.23-14.11	0.07-0.16	0.0-5.9	0.0-0.5
138:							
Rock outcrop, rhyolite or breccia---------------------	---	---	---	---	---	---	---
Highpeaks--------------------	0-4	12-27	1.30-1.42	4.23-14.11	0.10-0.15	0.0-1.0	0.5-2.0
	4-11	12-27	1.30-1.42	4.23-14.11	0.07-0.10	0.0-1.0	0.5-2.0
	11-15	12-27	1.30-1.42	4.23-14.11	0.07-0.10	0.0-1.0	0.5-2.0
	15-16	---	---	---	---	---	---
Chalone----------------------	0-4	10-22	1.50-1.60	4.23-14.11	0.05-0.12	0.0-3.0	0.5-1.0
	4-13	10-25	1.45-1.70	4.23-14.11	0.01-0.12	0.0-6.0	0.0-0.5
	13-24	10-25	1.45-1.70	4.23-14.11	0.01-0.12	0.0-6.0	0.0-0.5
	24-28	---	---	---	---	---	---
139:							
Highpeaks--------------------	0-3	12-18	1.30-1.42	4.23-14.11	0.10-0.15	0.0-1.0	0.5-2.0
	3-10	12-27	1.30-1.42	4.23-14.11	0.07-0.10	0.0-1.0	0.5-2.0
	10-15	12-27	1.30-1.42	4.23-14.11	0.05-0.08	0.0-1.0	0.5-2.0
	15-16	---	---	---	---	---	---
Rock outcrop, rhyolitic breccia---------------------	---	---	---	---	---	---	---
142:							
Ordeal-----------------------	0-6	2-10	1.50-1.80	42.34-141.14	0.02-0.13	0.0-1.0	0.5-1.8
	6-14	2-10	1.50-1.80	42.34-141.14	0.02-0.13	0.0-1.0	0.5-1.8
	14-23	5-10	1.55-1.70	42.34-141.14	0.04-0.06	0.0-1.0	0.0-0.5
	23-36	2-10	1.50-1.80	42.34-141.14	0.01-0.09	0.0-3.0	0.0-0.5
	36-40	---	---	---	---	---	---
Longsfolly-------------------	0-4	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	5.0-10
	4-16	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	5.0-10
	16-28	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	2.0-5.0
	28-50	2-10	1.55-1.65	42.34-141.14	0.05-0.07	0.0-1.0	2.0-5.0
	50-63	---	---	---	---	---	---
Passion----------------------	0-3	2-10	1.55-1.65	42.34-141.14	0.07-0.09	0.0-1.0	1.0-3.0
	3-7	2-10	1.55-1.65	42.00-141.00	0.07-0.09	0.0-1.0	1.0-3.0
	7-16	2-10	1.55-1.65	42.00-141.00	0.05-0.07	0.0-1.0	0.0-0.5
	16-61	2-10	1.55-1.65	42.00-141.00	0.05-0.07	0.0-1.0	0.0-0.5

Table 13.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
146:							
Badlands, scarps in conglomerate	---	---	---	---	---	---	---
148:							
Backdoor	0-5	8-25	1.45-1.60	4.23-14.11	0.09-0.17	0.0-6.0	0.5-1.0
	5-10	15-25	1.45-1.60	4.23-14.11	0.09-0.17	0.0-6.0	0.5-1.0
	10-15	20-35	1.40-1.55	1.41-4.23	0.07-0.20	3.0-6.0	0.0-0.5
	15-27	20-35	1.40-1.55	4.23-14.11	0.07-0.20	3.0-6.0	0.0-0.5
	27-60	5-10	1.50-1.70	42.34-141.14	0.04-0.13	0.0-3.0	0.0-0.5
Tuborcio	0-1	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	1-2	10-20	1.45-1.60	4.23-14.11	0.08-0.17	3.0-6.0	0.2-1.0
	2-8	10-25	1.45-1.60	4.23-14.11	0.08-0.17	3.0-6.0	0.2-1.0
	8-13	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	13-28	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	28-50	30-50	1.35-1.45	0.42-1.41	0.12-0.20	6.0-9.0	0.0-0.1
	50-60	22-30	1.45-1.55	4.23-14.11	0.01-0.04	6.0-9.0	0.0-0.1
152:							
Backdoor	0-2	8-20	1.50-1.60	4.23-14.11	0.10-0.13	0.0-3.0	0.5-1.0
	2-6	10-20	1.50-1.60	4.23-14.11	0.10-0.13	0.0-3.0	0.5-1.0
	6-11	20-35	1.45-1.55	1.41-4.23	0.14-0.17	3.0-6.0	0.0-0.5
	11-22	20-35	1.45-1.55	1.41-4.23	0.10-0.15	3.0-6.0	0.0-0.5
	22-27	35-40	1.35-1.45	0.42-1.41	0.07-0.11	6.0-9.0	0.0-0.5
	27-60	5-15	1.50-1.70	42.34-141.14	0.04-0.13	0.0-3.0	0.0-0.5
155:							
Chalone	0-3	10-18	1.50-1.60	4.23-14.11	0.05-0.12	0.0-3.0	0.5-1.0
	3-8	10-18	1.50-1.60	4.23-14.11	0.05-0.12	0.0-3.0	0.5-1.0
	8-20	10-18	1.45-1.70	14.11-42.34	0.05-0.12	0.0-6.0	0.0-0.5
	20-23	20-30	1.45-1.70	4.23-14.11	0.10-0.12	0.0-6.0	0.0-0.5
	23-24	---	---	---	---	---	---
Knuckle	0-1	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	1-4	5-10	1.55-1.65	14.11-42.34	0.04-0.09	0.0-1.0	0.5-1.0
	4-7	2-10	1.55-1.65	42.34-141.14	0.01-0.05	0.0-1.0	0.0-0.5
	7-8	---	---	---	---	---	---
Rock outcrop, rhyolite	---	---	---	---	---	---	---
156:							
Chalone	0-1	0-0	0.05-0.30	42.00-141.00	0.25-0.35	---	30-100
	1-4	10-22	1.50-1.60	4.23-14.11	0.17-0.19	0.0-3.0	0.5-1.0
	4-13	10-25	1.45-1.70	4.23-14.11	0.17-0.19	0.0-6.0	0.0-0.5
	13-22	10-25	1.45-1.70	4.23-14.11	0.01-0.12	0.0-6.0	0.0-0.5
	22-38	10-25	1.45-1.70	4.23-14.11	0.01-0.12	0.0-6.0	0.0-0.5
	38-41	---	---	---	---	---	---
Knuckle	0-2	2-8	1.55-1.65	42.34-141.14	0.04-0.09	0.0-1.0	0.5-1.0
	2-8	2-8	1.55-1.65	42.34-141.14	0.01-0.05	0.0-1.0	0.0-0.5
	8-12	2-8	1.55-1.65	42.34-141.14	0.01-0.05	0.0-1.0	0.0-0.5
	12-23	---	---	---	---	---	---
Firstsister	0-4	5-15	1.45-1.60	14.11-42.34	0.02-0.11	0.0-3.0	1.0-4.0
	4-31	8-15	1.45-1.60	14.11-42.34	0.02-0.09	0.0-3.0	1.0-2.0
	31-59	8-15	1.45-1.60	14.11-42.34	0.02-0.09	0.0-3.0	1.0-2.0
PgE:							
Pinnacles	0-4	10-20	1.55-1.65	4.23-14.11	0.08-0.12	0.0-2.9	0.5-1.0
	4-10	10-20	1.55-1.65	4.23-14.11	0.07-0.11	0.0-2.9	0.5-1.0
	10-17	10-20	1.55-1.65	4.23-14.11	0.07-0.11	0.0-2.9	0.5-1.0
	17-23	27-35	1.40-1.50	1.41-4.23	0.11-0.18	3.0-5.9	0.0-0.5
	23-30	40-45	1.35-1.45	0.42-1.41	0.09-0.14	6.0-8.9	0.0-0.5
	30-36	---	---	0.01-0.42	---	---	---

Table 13.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity (K_{sat})	Available water capacity	Linear extensi- bility	Organic matter
	In	*Pct*	*g/cc*	*um/sec*	*In/in*	*Pct*	*Pct*
PhG2:							
Pinnacles--------------------	0-4	10-20	1.55-1.65	4.23-14.11	0.08-0.12	0.0-2.9	0.5-1.0
	4-10	10-20	1.55-1.65	4.23-14.11	0.07-0.11	0.0-2.9	0.5-1.0
	10-17	10-20	1.55-1.65	4.23-14.11	0.07-0.11	0.0-2.9	0.5-1.0
	17-23	27-35	1.40-1.50	1.41-4.23	0.11-0.18	3.0-5.9	0.0-0.5
	23-30	40-45	1.35-1.45	0.42-1.41	0.09-0.14	6.0-8.9	0.0-0.5
	30-36	---	---	0.01-0.42	---	---	---
PnE2:							
Pinnacles--------------------	0-8	10-20	1.50-1.50	4.23-14.11	0.06-0.12	0.0-2.9	0.5-1.0
	8-12	10-20	1.50-1.50	4.23-14.11	0.06-0.12	0.0-2.9	0.0-0.5
	12-25	35-55	1.35-1.50	0.42-1.41	0.09-0.17	6.0-8.9	0.0-0.1
	25-60	---	---	---	---	---	---
PnG3:							
Pinnacles--------------------	0-8	10-20	1.50-1.50	4.23-14.11	0.06-0.12	0.0-2.9	0.5-1.0
	8-12	10-20	1.50-1.50	4.23-14.11	0.06-0.12	0.0-2.9	0.0-0.5
	12-25	35-55	1.35-1.50	0.42-1.41	0.09-0.17	6.0-8.9	0.0-0.1
	25-60	---	---	---	---	---	---
SdG3:							
Santa Lucia------------------	0-4	18-27	1.45-1.55	4.23-14.11	0.13-0.18	0.0-2.9	2.0-10
	4-14	18-27	1.45-1.55	4.23-14.11	0.08-0.14	0.0-2.9	2.0-10
	14-18	---	---	0.00-1.40	---	---	---

Table 14.--Chemical Properties of the Soils

(Soil properties are measured or inferred from direct observations in the field or laboratory. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
101:									
Ordeal	0-5	2-10	2.4-9.9	---	6.1-6.5	0	0	0.0-1.0	0
	5-16	2-10	2.4-9.9	---	6.1-6.5	0	0	0.0-1.0	0
	16-21	2-10	1.6-7.2	---	6.1-6.5	0	0	0.0-1.0	0
	21-25	---	---	---	---	---	---	---	---
Passion	0-3	2-10	1.9-8.5	---	6.1-7.8	0	0	0.0-2.0	0
	3-8	2-10	1.9-8.5	---	6.1-7.8	0	0	0.0-2.0	0
	8-13	2-10	1.4-7.4	---	6.1-7.8	0	0	0.0-2.0	0
	13-61	2-10	1.4-7.4	---	6.1-7.8	0	0	0.0-2.0	0
Badlands	---	---	---	---	---	---	---	---	---
104:									
Knuckle	0-6	2-8	---	1-3	5.1-6.5	0	0	0.0-1.0	0
	6-17	2-8	1.4-6.1	---	5.6-7.3	0	0	0.0-1.0	0
	17-20	2-8	1.4-6.1	---	5.6-7.3	0	0	0.0-1.0	0
	20-21	---	---	---	---	---	---	---	---
Burgundy	0-1	10-15	8.9-19	---	5.0-7.4	0	0	0.0-1.0	0
	1-6	10-15	8.9-16	---	5.0-7.4	0	0	0.0-1.0	0
	6-7	---	---	---	---	---	---	---	---
Argixerolls	0-4	10-16	---	6-11	5.1-6.4	0	0	0.0-1.0	0
	4-10	18-22	---	10-14	5.1-6.3	0	0	0.0-1.0	0
	10-27	15-30	---	6-16	5.1-6.3	0	0	0.0-1.0	0
	27-31	---	---	---	---	---	---	---	---
105:									
Chalone	0-3	5-10	4.6-8.9	---	5.5-7.5	0	0	0.0-1.0	0
	3-8	10-18	7.6-15	---	5.2-6.9	0	0	0.0-1.0	0
	8-20	10-18	7.6-15	---	5.2-6.9	0	0	0.0-1.0	0
	20-33	---	---	---	---	---	---	---	---
Firstsister	0-1	0-0	50-103	---	5.6-6.5	0	0	0	0
	1-5	5-18	4.8-40	---	6.8-7.5	0	0	0.0-1.0	0-1
	5-22	5-18	4.8-25	---	6.8-7.5	0	0	0.0-1.0	0-1
	22-59	5-10	4.8-13	---	7.0-7.8	0	0	0.0-1.0	0-1

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
105:									
Highpeaks------------------------------------	0-2	0-0	50-103	---	5.6-6.5	0	0	0	0
	2-5	12-18	10-52	---	5.6-7.3	0	0	0.0-2.0	0-2
	5-13	12-18	10-31	---	5.6-7.3	0	0	0.0-2.0	0-2
	13-21	---	---	---	---	---	---	---	---
	21-22	---	---	---	---	---	---	---	---
106:									
Casino---------------------------------------	0-4	18-27	23-30	---	5.8-7.6	0	0	0.0-1.0	0-1
	4-10	30-38	23-30	---	5.8-7.6	0	0	0.0-1.0	0-1
	10-20	38-60	28-43	---	5.5-7.6	0	0	0.0-1.0	0-1
	20-37	38-60	28-43	---	5.5-7.6	0	0	0.0-1.0	0-1
	37-38	---	---	---	---	---	---	---	---
Argixerolls----------------------------------	0-2	15-35	12-25	---	6.6-7.3	0	0	0.0-1.0	0
	2-6	25-60	17-38	---	6.6-7.3	0	0	0.0-1.0	0
	6-7	30-50	20-32	---	6.6-7.3	0	0	0.0-1.0	0
	7-11	---	---	---	---	---	---	---	---
107:									
Casino---------------------------------------	0-1	20-35	17-28	---	5.8-7.6	0	0	0.0-1.0	0-1
	1-7	20-35	17-28	---	5.8-7.6	0	0	0.0-1.0	0-1
	7-12	35-40	26-30	---	5.5-7.6	0	0	0.0-1.0	0-1
	12-21	35-40	26-30	---	5.5-7.6	0	0	0.0-1.0	0-1
	21-31	40-60	29-43	---	5.5-7.6	0	0	0.0-1.0	0-1
	31-33	---	---	---	---	---	---	---	---
109:									
Rock outcrop, pinnacles of rhyolitic breccia	---	---	---	---	---	---	---	---	---
Highpeaks------------------------------------	0-3	12-18	10-16	---	5.6-7.3	0	0	0.0-2.0	0-2
	3-8	12-18	10-16	---	5.6-7.3	0	0	0.0-2.0	0-2
	8-15	12-18	10-16	---	5.6-7.3	0	0	0.0-2.0	0-2
	15-16	---	---	---	---	---	---	---	---
Burgundy-------------------------------------	0-1	10-15	8.9-14	---	5.0-7.4	0	0	0.0-1.0	0
	1-6	10-15	8.9-14	---	5.0-7.4	0	0	0.0-1.0	0
	6-8	---	---	---	---	---	---	---	---
110:									
Knuckle--------------------------------------	0-3	2-10	---	1-4	5.1-6.5	0	0	0.0-1.0	0
	3-12	2-8	1.4-6.1	---	5.6-7.3	0	0	0.0-1.0	0
	12-17	2-8	1.4-6.1	---	5.6-7.3	0	0	0.0-1.0	0
	17-23	---	---	---	---	---	---	---	---

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
110:									
Chalone	0-1	0-0	---	---	5.6-6.5	0	0	0	0
	1-3	0-0	50-103	---	5.6-6.5	0	0	0	0
	3-8	10-18	8.6-15	---	5.5-7.5	0	0	0.0-1.0	0
	8-12	22-30	15-23	---	5.2-6.9	0	0	0.0-1.0	0
	12-30	22-30	15-23	---	5.2-6.9	0	0	0.0-1.0	0
	30-34	---	---	---	---	---	---	---	---
Burgundy	0-2	10-15	9.5-14	---	5.0-7.4	0	0	0.0-1.0	0
	2-5	10-15	8.9-14	---	5.0-7.4	0	0	0.0-1.0	0
	5-6	---	---	---	---	---	---	---	---
111:									
Backdoor sandy loam	0-5	8-25	---	2-8	5.0-7.7	0	0	0.0-1.0	0
	5-10	18-25	9.6-13	---	5.0-7.7	0	0	0.0-1.0	0
	10-15	20-35	---	6-18	5.0-7.3	0	0	0.0-1.0	0
	15-27	20-35	---	6-18	5.0-7.3	0	0	0.0-1.0	0
	27-60	5-20	---	1-9	5.1-5.5	0	0	0.0-1.0	0
Backdoor gravelly sandy loam	0-4	8-25	4.3-13	---	5.0-7.7	0	0	0.0-1.0	0
	4-17	20-35	10-18	---	5.0-7.3	0	0	0.0-1.0	0
	17-28	20-35	10-18	---	5.0-7.3	0	0	0.0-1.0	0
	28-60	0-10	---	0-4	5.1-5.5	0	0	0.0-1.0	0
Tuborcio	0-3	10-18	8.4-15	---	5.6-7.0	0	0	0	0
	3-14	10-18	8.4-15	---	5.6-7.0	0	0	0	0
	14-21	10-18	8.4-15	---	5.6-7.0	0	0	0	0
	21-28	40-50	26-35	---	5.6-7.0	0	0	0	0
	28-33	40-50	26-35	---	5.6-7.0	0	0	0	0
	33-41	20-35	14-25	---	6.0-7.0	0	0	0	0
112:									
Rimtrail	0-2	14-18	13-17	---	6.1-7.8	0	0	0.0-2.0	0
	2-11	14-18	13-17	---	6.1-7.8	0	0	0.0-2.0	0
	11-22	14-18	13-17	---	6.1-7.8	0	0	0.0-2.0	0
	22-29	25-38	20-30	---	6.1-7.8	0	0	0.0-2.0	0
	29-45	25-38	20-30	---	6.1-7.8	0	0	0.0-2.0	0
	45-59	25-38	20-30	---	6.1-7.8	0	0	0.0-2.0	0
113:									
Elder	0-0.5	0-0	50-103	---	5.6-6.5	0	0	0	0
	0.5-3	10-12	8.9-11	---	7.4-7.8	0	0	0.0-2.0	0
	3-20	12-15	10-13	---	7.4-8.0	0	0	0.0-2.0	0
	20-22	10-15	7.6-13	---	7.4-8.0	0	0	0.0-2.0	0
	22-44	10-15	7.6-13	---	7.4-8.0	0	0	0.0-2.0	0
	44-56	5-15	4.1-13	---	7.4-8.0	0	0	0.0-2.0	0

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
113:									
Oxyaquic Haploxerolls, rarely flooded-------	0-2	3-15	3.3-14	---	7.4-8.4	0	0	0.0-1.0	0-5
	2-11	3-15	3.3-14	---	6.6-8.4	0	0	0.0-1.0	0-5
	11-14	3-20	3.3-18	---	7.4-8.4	0	0	0.0-1.0	0-5
	14-26	3-20	3.3-18	---	7.4-8.4	0	0	0.0-1.0	0-5
	26-33	3-20	3.3-18	---	7.4-8.4	0	0	0.0-1.0	0-5
	33-37	3-20	3.3-18	---	7.4-8.4	0	0	0.0-1.0	0-5
	37-59	1-20	0.8-14	---	7.4-8.4	0	0	0.0-1.0	0-5
114:									
Ordeal--------------------------------------	0-13	5-15	---	4-10	5.1-5.5	0	0	0.0-1.0	0
	13-30	5-10	---	2-9	4.5-5.5	0	0	0.0-1.0	0
	30-33	---	---	---	---	---	---	---	---
Tuborcio------------------------------------	0-13	10-18	8.4-15	---	5.6-7.0	0	0	0	0
	13-17	30-50	20-35	---	5.6-7.0	0	0	0	0
	17-24	30-50	20-35	---	5.6-7.0	0	0	0	0
	24-40	30-50	20-35	---	5.6-7.0	0	0	0	0
	40-60	20-30	14-22	---	6.0-7.0	0	0	0	0
Passion-------------------------------------	0-5	2-10	1.9-8.5	---	6.1-7.3	0	0	0.0-1.0	0
	5-11	2-10	1.9-8.5	---	6.1-7.3	0	0	0.0-1.0	0
	11-17	2-10	1.8-7.8	---	6.1-7.3	0	0	0.0-1.0	0
	17-21	---	---	---	---	---	---	---	---
115:									
Tuborcio------------------------------------	0-4	10-20	8.4-17	---	5.0-7.0	0	0	0	0
	4-14	30-50	20-35	---	5.6-7.0	0	0	0	0
	14-20	30-50	20-35	---	5.6-7.0	0	0	0	0
	20-29	30-50	20-35	---	5.6-7.0	0	0	0	0
	29-45	30-50	20-35	---	5.6-7.0	0	0	0	0
	45-60	20-30	14-22	---	6.0-7.0	0	0	0	0
117:									
Elder---------------------------------------	0-3	7-15	6.4-13	---	6.8-7.8	0	0	0.0-1.0	0
	3-12	7-15	6.4-13	---	6.8-7.8	0	0	0.0-1.0	0
	12-24	7-15	6.4-13	---	6.8-7.8	0	0	0.0-1.0	0
	24-33	3-15	2.6-12	---	7.0-7.8	0	0	0.0-1.0	0
	33-36	20-35	17-28	---	7.0-7.6	0	0	0.0-1.0	0
	36-43	3-15	2.6-12	---	7.0-7.8	0	0	0.0-1.0	0
	43-45	20-35	17-28	---	7.0-7.6	0	0	0.0-1.0	0
	45-61	3-15	2.6-12	---	7.0-7.8	0	0	0.0-1.0	0

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
119:									
Still-------------------------------------	0-4	40-45	31-36	---	6.6-7.8	0	0	0.0-2.0	0-5
	4-20	40-45	31-35	---	7.4-8.4	1-2	0	0.0-2.0	0-5
	20-35	27-35	22-28	---	7.4-8.4	1-2	0	0.0-2.0	0-5
	35-59	18-27	13-21	---	7.4-8.4	1-2	0	0.0-2.0	0-5
120:									
Elder-------------------------------------	0-3	0-18	0.0-16	---	7.4-7.8	0	0	0.0-2.0	0
	3-24	0-18	0.0-16	---	7.4-7.8	0	0	0.0-2.0	0
	24-33	0-18	0.0-15	---	7.4-7.8	0	0	0.0-2.0	0
	33-53	0-18	0.0-15	---	7.4-7.8	0	0	0.0-2.0	0
	53-59	15-27	11-22	---	7.4-7.8	0	0	0.0-2.0	0
122:									
Tuborcio----------------------------------	0-3	10-20	8.4-17	---	5.6-7.0	0	0	0	0
	3-13	10-25	---	5-13	5.1-7.0	0	0	0	0
	13-24	30-50	---	14-23	5.1-7.0	0	0	0	0
	24-33	30-50	---	14-23	5.1-7.0	0	0	0	0
	33-49	30-50	20-35	---	5.6-7.0	0	0	0	0
	49-60	20-30	14-22	---	6.0-7.0	0	0	0	0
123:									
Teapot------------------------------------	0-3	18-25	16-22	---	4.5-6.5	0	0	0.0-2.0	0
	3-18	20-25	---	10-13	4.5-5.5	0	0	0.0-2.0	0
	18-61	20-25	---	10-13	4.5-5.5	0	0	0.0-2.0	0
Rock outcrop, diatomaceous mudstone---------	---	---	---	---	---	---	---	---	---
127:									
Argixerolls--------------------------------	0-3	10-20	8.5-16	---	6.1-6.5	0	0	0.0-1.0	0
	3-12	15-20	12-16	---	6.1-6.5	0	0	0.0-1.0	0
	12-21	15-20	10-14	---	6.1-6.5	0	0	0.0-1.0	0
	21-28	20-30	14-20	---	6.1-6.5	0	0	0.0-1.0	0
	28-32	---	---	---	---	---	---	---	---
Rock outcrop, rhyolite---------------------	---	---	---	---	---	---	---	---	---
Chalone------------------------------------	0-0.5	0-0	---	---	5.6-6.5	0	0	0	0
	0.5-2	10-22	8.6-18	---	5.5-7.5	0	0	0.0-1.0	0
	2-5	10-22	8.6-18	---	5.5-7.5	0	0	0.0-1.0	0
	5-16	10-25	---	5-13	5.2-6.9	0	0	0.0-1.0	0
	16-20	10-25	---	5-13	5.2-6.9	0	0	0.0-1.0	0
	20-21	---	---	---	---	---	---	---	---

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
128:									
Still	0-3	0-0	50-103	---	5.6-6.5	0	0	0	0
	3-9	6-20	5.6-17	---	6.6-8.4	0	0	0.0-2.0	0-5
	9-21	12-27	10-23	---	6.6-8.4	0	0	0.0-2.0	0-5
	21-31	20-35	17-29	---	6.6-8.4	0	0	0.0-2.0	0-5
	31-38	15-35	20-28	---	6.6-8.4	0-1	0	0.0-2.0	0-5
	38-47	27-40	22-30	---	6.6-8.4	0-1	0	0.0-2.0	0-5
	47-59	25-40	17-29	---	6.6-8.4	0-1	0	0.0-2.0	0-5
	59-65	25-40	17-29	---	6.6-8.4	0-1	0	0.0-2.0	0-5
Riverwash	---	---	---	---	---	---	---	---	---
131:									
Firstsister	0-2	0-0	50-103	---	5.6-6.5	0	0	0	0
	2-8	5-20	4.8-40	---	6.8-7.5	0	0	0.0-1.0	0-1
	8-35	5-20	4.8-25	---	6.8-7.5	0	0	0.0-1.0	0-1
	35-59	8-19	7.3-16	---	7.0-7.8	0	0	0.0-1.0	0-1
Oxyaquic Haploxerolls, frequently flooded	0-4	0-0	50-103	---	5.6-6.5	0	0	0	0
	4-8	10-20	8.5-18	---	5.1-6.0	0	0	0.0-1.0	0
	8-35	15-20	10-14	---	5.1-6.0	0	0	0.0-1.0	0
	35-67	2-10	1.6-7.2	---	5.1-6.0	0	0	0.0-1.0	0
Rock outcrop, rhyolite or breccia	---	---	---	---	---	---	---	---	---
132:									
Toags	0-3	2-10	2.2-9.3	---	6.1-7.8	0	0	0.0-2.0	0
	3-7	2-10	2.0-8.8	---	6.1-7.8	0	0	0.0-2.0	0
	7-24	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0
	24-38	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0
	38-60	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0
Oxyaquic Haploxerolls, rarely flooded	0-2	0-0	50-103	---	5.6-6.5	0	0	0	0
	2-5	3-8	2.6-8.8	---	4.5-5.5	0	0	0.0-1.0	0
	5-19	1-3	0.8-2.3	---	5.1-5.5	0	0	0.0-1.0	0
	19-24	3-5	2.6-5.8	---	5.1-5.5	0	0	0.0-1.0	0
	24-26	1-3	---	1-3	5.0-5.5	0	0	0.0-1.0	0
	26-51	1-3	---	1-3	5.0-5.8	0	0	0.0-1.0	0
Riverwash	---	---	---	---	---	---	---	---	---
133:									
Toags	0-7	2-10	2.2-9.3	---	6.1-7.8	0	0	0.0-2.0	0
	7-24	2-10	2.0-8.8	---	6.1-7.8	0	0	0.0-2.0	0
	24-42	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0
	42-60	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
133:									
Pinncamp	0-2	0-0	---	---	5.6-6.5	0	0	0	0
	2-4	0-0	33-103	---	5.6-7.3	0	0	0	0
	4-12	2-10	3.1-12	---	5.6-7.8	0	0	0.0-2.0	0
	12-22	2-10	3.1-12	---	5.6-7.8	0	0	0.0-2.0	0
	22-36	2-10	2.8-11	---	6.1-7.8	0	0	0.0-2.0	0
	36-64	2-10	2.8-11	---	6.1-7.8	0	0	0.0-2.0	0
134:									
Toags	0-5	2-10	2.2-9.3	---	6.1-7.8	0	0	0.0-2.0	0
	5-61	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0
135:									
Toags	0-7	2-10	2.2-9.3	---	6.1-7.8	0	0	0.0-2.0	0
	7-24	2-10	2.0-8.8	---	6.1-7.8	0	0	0.0-2.0	0
	24-42	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0
	42-60	2-10	1.8-7.8	---	6.1-7.8	0	0	0.0-2.0	0
Riverwash	---	---	---	---	---	---	---	---	---
136:									
Oxyaquic Haploxerolls, ponded	0-4	35-45	23-34	---	6.6-8.4	0-1	0	0.0-2.0	0-5
	4-20	15-45	12-34	---	6.6-8.4	0-1	0	0.0-2.0	0-5
	20-35	30-34	20-22	---	6.6-8.4	0	0	0.0-2.0	0-5
	35-47	30-35	20-27	---	6.6-7.8	0	0	0.0-2.0	0-5
	47-49	3-10	2.3-7.2	---	6.6-7.8	0	0	0.0-2.0	0-5
	49-59	3-20	2.3-14	---	6.6-7.8	0	0	0.0-2.0	0-5
138:									
Rock outcrop, rhyolite or breccia	---	---	---	---	---	---	---	---	---
Highpeaks	0-4	12-27	10-22	---	5.6-7.3	0	0	0.0-2.0	0-2
	4-11	12-27	10-22	---	5.6-7.3	0	0	0.0-2.0	0-2
	11-15	12-27	10-22	---	5.6-7.3	0	0	0.0-2.0	0-2
	15-16	---	---	---	---	---	---	---	---
Chalone	0-4	10-22	8.6-18	---	5.5-7.5	0	0	0.0-1.0	0
	4-13	10-25	7.6-20	---	5.2-6.9	0	0	0.0-1.0	0
	13-24	10-25	7.6-20	---	5.2-6.9	0	0	0.0-1.0	0
	24-28	---	---	---	---	---	---	---	---
139:									
Highpeaks	0-3	12-18	10-16	---	5.6-7.3	0	0	0.0-2.0	0-2
	3-10	12-27	10-22	---	5.6-7.3	0	0	0.0-2.0	0-2
	10-15	12-27	10-22	---	5.6-7.3	0	0	0.0-2.0	0-2
	15-16	---	---	---	---	---	---	---	---

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	meq/100g	pH	Pct	Pct	dS/m	
139:									
Rock outcrop, rhyolitic breccia	---	---	---	---	---	---	---	---	---
142:									
Ordeal	0-6	2-10	2.4-9.9	---	5.3-7.0	0	0	0.0-1.0	0
	6-14	2-10	2.4-9.9	---	5.3-7.0	0	0	0.0-1.0	0
	14-23	5-10	3.8-7.2	---	5.0-7.0	0	0	0.0-1.0	0
	23-36	2-10	1.6-7.2	---	5.0-7.0	0	0	0.0-1.0	0
	36-40	---	---	---	---	---	---	---	---
Longsfolly	0-4	2-10	3.1-16	---	6.1-7.8	0	0	0.0-2.0	0
	4-16	2-10	3.1-12	---	6.1-7.8	0	0	0.0-2.0	0
	16-28	2-10	2.8-11	---	5.6-7.8	0	0	0.0-2.0	0
	28-50	2-10	2.8-11	---	5.6-7.8	0	0	0.0-2.0	0
	50-63	---	---	---	5.1-6.5	---	---	---	---
Passion	0-3	2-10	1.9-8.5	---	6.1-7.8	0	0	0.0-1.0	0
	3-7	2-10	1.9-8.5	---	6.1-7.8	0	0	0.0-1.0	0
	7-16	2-10	1.4-7.4	---	6.1-7.8	0	0	0.0-1.0	0
	16-61	2-10	1.4-7.4	---	6.1-7.8	0	0	0.0-1.0	0
146:									
Badlands, scarps in conglomerate	---	---	---	---	---	---	---	---	---
148:									
Backdoor	0-5	8-25	---	2-8	5.0-7.7	0	0	0.0-1.0	0
	5-10	15-25	8.0-13	---	5.0-7.7	0	0	0.0-1.0	0
	10-15	20-35	---	6-18	5.0-7.3	0	0	0.0-1.0	0
	15-27	20-35	---	6-18	5.0-7.3	0	0	0.0-1.0	0
	27-60	5-10	---	1-4	5.1-5.5	0	0	0.0-1.0	0
Tuborcio	0-1	0-0	50-103	---	5.6-6.5	0	0	0	0
	1-2	10-20	8.4-17	---	5.6-7.0	0	0	0	0
	2-8	10-25	8.4-20	---	5.6-7.0	0	0	0	0
	8-13	30-50	20-35	---	5.6-7.1	0	0	0	0
	13-28	30-50	20-35	---	5.6-7.0	0	0	0	0
	28-50	30-50	20-35	---	5.6-7.0	0	0	0	0
	50-60	22-30	15-22	---	6.0-7.0	0	0	0	0
152:									
Backdoor	0-2	8-20	4.3-11	---	5.1-7.7	0	0	0.0-1.0	0
	2-6	10-20	5.4-11	---	5.1-7.7	0	0	0.0-1.0	0
	6-11	20-35	10-18	---	5.1-7.3	0	0	0.0-1.0	0
	11-22	20-35	10-18	---	5.1-7.3	0	0	0.0-1.0	0
	22-27	35-40	18-21	---	5.1-7.3	0	0	0.0-1.0	0
	27-60	5-15	2.6-8.0	---	5.1-6.5	0	0	0.0-1.0	0

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
155:									
Chalone	0-3	10-18	8.6-15	---	5.5-7.5	0	0	0.0-1.0	0
	3-8	10-18	8.6-15	---	5.5-7.5	0	0	0.0-1.0	0
	8-20	10-18	7.6-15	---	5.2-6.9	0	0	0.0-1.0	0
	20-23	20-30	14-23	---	5.2-6.9	0	0	0.0-1.0	0
	23-24	---	---	---	---	---	---	---	---
Knuckle	0-1	0-0	50-103	---	5.6-6.5	0	0	0	0
	1-4	5-10	4.0-7.8	---	5.1-6.5	0	0	0.0-1.0	0
	4-7	2-10	1.4-7.4	---	5.6-7.3	0	0	0.0-1.0	0
	7-8	---	---	---	---	---	---	---	---
Rock outcrop, rhyolite	---	---	---	---	---	---	---	---	---
156:									
Chalone	0-1	0-0	50-103	---	5.6-6.5	0	0	0	0
	1-4	10-22	8.6-18	---	5.5-7.5	0	0	0.0-1.0	0
	4-13	10-25	7.6-20	---	5.2-6.9	0	0	0.0-1.0	0
	13-22	10-25	7.6-20	---	5.2-6.9	0	0	0.0-1.0	0
	22-38	10-25	7.6-20	---	5.2-6.9	0	0	0.0-1.0	0
	38-41	---	---	---	---	---	---	---	---
Knuckle	0-2	2-8	---	1-3	5.1-6.5	0	0	0.0-1.0	0
	2-8	2-8	1.4-6.1	---	5.6-7.3	0	0	0.0-1.0	0
	8-12	2-8	1.4-6.1	---	5.6-7.3	0	0	0.0-1.0	0
	12-23	---	---	---	---	---	---	---	---
Firstsister	0-4	5-15	4.8-14	---	6.8-7.5	0	0	0.0-1.0	0-1
	4-31	8-15	7.3-13	---	7.0-7.5	0	0	0.0-1.0	0-1
	31-59	8-15	7.3-13	---	7.0-7.5	0	0	0.0-1.0	0-1
PgE:									
Pinnacles	0-4	10-20	8.9-17	---	5.6-6.5	0	0	0.0-2.0	0
	4-10	10-20	8.9-17	---	5.6-6.5	0	0	0.0-2.0	0
	10-17	10-20	---	5-13	4.5-6.0	0	0	0.0-2.0	0
	17-23	27-35	---	14-23	4.5-6.0	0	0	0.0-2.0	0
	23-30	40-45	---	20-29	4.5-6.0	0	0	0.0-2.0	0
	30-36	---	---	---	---	---	---	---	---
PhG2:									
Pinnacles	0-4	10-20	8.9-17	---	5.6-6.5	0	0	0.0-2.0	0
	4-10	10-20	8.9-17	---	5.6-6.5	0	0	0.0-2.0	0
	10-17	10-20	---	5-13	4.5-6.0	0	0	0.0-2.0	0
	17-23	27-35	---	14-23	4.5-6.0	0	0	0.0-2.0	0
	23-30	40-45	---	20-29	4.5-6.0	0	0	0.0-2.0	0
	30-36	---	---	---	---	---	---	---	---

Table 14.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*Pct*	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*dS/m*	
PnE2:									
Pinnacles	0-8	10-20	8.9-17	---	5.6-7.3	0	0	0	0
	8-12	10-20	8.0-16	---	5.6-7.3	0	0	0	0
	12-25	35-55	---	20-36	5.1-6.0	0	0	0	0
	25-60	---	---	---	---	---	---	---	---
PnG3:									
Pinnacles	0-8	10-20	8.9-17	---	5.6-7.3	0	0	0	0
	8-12	10-20	8.0-16	---	5.6-7.3	0	0	0	0
	12-25	35-55	---	20-36	5.1-6.0	0	0	0	0
	25-60	---	---	---	---	---	---	---	---
SdG3:									
Santa Lucia	0-4	18-27	16-24	---	5.6-6.5	0	0	0	0
	4-14	18-27	16-24	---	5.6-6.5	0	0	0	0
	14-18	---	---	---	---	---	---	---	---

Table 15.--Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	*Ft*	*Ft*				
101:									
Ordeal	B	January-December	---	---	---	---	None	---	None
Passion	C	January-December	---	---	---	---	None	---	None
Badlands	---	---	---	---	---	---	---	---	---
104:									
Knuckle	D	January-December	---	---	---	---	None	---	None
Burgundy	D	January-December	---	---	---	---	None	---	None
Argixerolls	D	January-December	---	---	---	---	None	---	None
105:									
Chalone	B	January-December	---	---	---	---	None	---	None
Firstsister	B	January-December	---	---	---	---	None	---	None
Highpeaks	D	January-December	---	---	---	---	None	---	None
106:									
Casino	D	January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
106:									
Argixerolls	D								
		January-December	---	---	---	---	None	---	None
107:									
Casino	D								
		January-December	---	---	---	---	None	---	None
109:									
Rock outcrop, pinnacles of rhyolitic breccia	---	---	---	---	---	---	---	---	---
Highpeaks	D								
		January-December	---	---	---	---	None	---	None
Burgundy	D								
		January-December	---	---	---	---	None	---	None
110:									
Knuckle	D								
		January-December	---	---	---	---	None	---	None
Chalone	B								
		January-December	---	---	---	---	None	---	None
Burgundy	D								
		January-December	---	---	---	---	None	---	None
111:									
Backdoor sandy loam	B								
		January-December	---	---	---	---	None	---	None
Backdoor gravelly sandy loam	B								
		January-December	---	---	---	---	None	---	None
Tuborcio	C								
		January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
112:									
Rimtrail	C								
		January-December	---	---	---	---	None	---	None
113:									
Elder	B								
		January	---	---	---	---	None	---	None
		February	---	---	---	---	None	Very brief	Occasional
		March	---	---	---	---	None	Very brief	Occasional
		April	---	---	---	---	None	Very brief	Occasional
		May	---	---	---	---	None	---	None
		June	---	---	---	---	None	---	None
		July	---	---	---	---	None	---	None
		August	---	---	---	---	None	---	None
		September	---	---	---	---	None	---	None
		October	---	---	---	---	None	---	None
		November	---	---	---	---	None	---	None
		December	---	---	---	---	None	---	None
Oxyaquic Haploxerolls, rarely flooded	B								
		January	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		February	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		March	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		April	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		May	2.5-3.3	4.9-4.9	---	---	None	---	None
		June	3.3-4.9	4.9-4.9	---	---	None	---	None
		July	3.3-4.9	4.9-4.9	---	---	None	---	None
		August	3.3-4.9	4.9-4.9	---	---	None	---	None
		September	3.3-4.9	4.9-4.9	---	---	None	---	None
		October	3.3-4.9	4.9-4.9	---	---	None	---	None
		November	3.3-4.9	4.9-4.9	---	---	None	---	None
		December	2.5-3.3	4.9-4.9	---	---	None	---	None
114:									
Ordeal	B								
		January-December	---	---	---	---	None	---	None
Tuborcio	C								
		January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	*Ft*	*Ft*				
114:									
Passion	C								
		January-December	---	---	---	---	None	---	None
115:									
Tuborcio	C								
		January-December	---	---	---	---	None	---	None
117:									
Elder	B								
		January-December	---	---	---	---	None	---	None
119:									
Still	B								
		January-December	---	---	---	---	None	---	None
120:									
Elder	B								
		January-December	---	---	---	---	None	---	None
122:									
Tuborcio	C								
		January-December	---	---	---	---	None	---	None
123:									
Teapot	C								
		January-	---	---	---	---	None	---	None
Rock outcrop, diatomaceous mudstone	---	---	---	---	---	---	---	---	---
127:									
Argixerolls	D								
		January-December	---	---	---	---	None	---	None
Rock outcrop, rhyolite	---	---	---	---	---	---	---	---	---
Chalone	B								
		January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
128:									
Still	B								
		January-December	---	---	---	---	None	---	None
Riverwash	A								
		January	0.0	4.9-4.9	---	---	None	Long	Frequent
		February	0.0	4.9-4.9	---	---	None	Long	Frequent
		March	0.0	4.9-4.9	---	---	None	Long	Frequent
		April	0.0	4.9-4.9	---	---	None	Long	Frequent
		May	0.0	4.9-4.9	---	---	None	Long	Frequent
		June	0.0	4.9-4.9	---	---	None	Long	Frequent
		July	0.8-4.9	4.9-4.9	---	---	None	---	None
		August	0.8-4.9	4.9-4.9	---	---	None	---	None
		September	0.8-4.9	4.9-4.9	---	---	None	---	None
		October	0.8-4.9	4.9-4.9	---	---	None	---	None
		November	0.8-4.9	4.9-4.9	---	---	None	---	None
		December	0.0-3.3	4.9-4.9	---	---	None	---	None
131:									
Firstsister	B								
		January-December	---	---	---	---	None	---	None
Oxyaquic Haploxerolls, frequently flooded	B								
		January	2.5-3.3	4.9-4.9	---	---	None	Long	Frequent
		February	2.5-3.3	4.9-4.9	---	---	None	Long	Frequent
		March	2.5-3.3	4.9-4.9	---	---	None	Long	Frequent
		April	2.5-3.3	4.9-4.9	---	---	None	Long	Frequent
		May	2.5-3.3	4.9-4.9	---	---	None	---	None
		June	3.3-4.9	4.9-4.9	---	---	None	---	None
		July	3.3-4.9	4.9-4.9	---	---	None	---	None
		August	3.3-4.9	4.9-4.9	---	---	None	---	None
		September	3.3-4.9	4.9-4.9	---	---	None	---	None
		October	3.3-4.9	4.9-4.9	---	---	None	---	None
		November	3.3-4.9	4.9-4.9	---	---	None	---	None
		December	2.5-3.3	4.9-4.9	---	---	None	---	None
Rock outcrop, rhyolite or brexxia	---	---	---	---	---	---	---	---	---
132:									
Toags	A								
		January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
132:									
Oxyaquic Haploxerolls, rarely flooded----	B								
		January	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		February	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		March	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		April	2.5-3.3	4.9-4.9	---	---	None	Very brief	Rare
		May	2.5-3.3	4.9-4.9	---	---	None	---	None
		June	3.3-4.9	4.9-4.9	---	---	None	---	None
		July	3.3-4.9	4.9-4.9	---	---	None	---	None
		August	3.3-4.9	4.9-4.9	---	---	None	---	None
		September	3.3-4.9	4.9-4.9	---	---	None	---	None
		October	3.3-4.9	4.9-4.9	---	---	None	---	None
		November	3.3-4.9	4.9-4.9	---	---	None	---	None
		December	2.5-3.3	4.9-4.9	---	---	None	---	None
Riverwash-------------------------------	A								
		January	0.0	4.9-4.9	---	---	None	Long	Frequent
		February	0.0	4.9-4.9	---	---	None	Long	Frequent
		March	0.0	4.9-4.9	---	---	None	Long	Frequent
		April	0.0	4.9-4.9	---	---	None	Long	Frequent
		May	0.0	4.9-4.9	---	---	None	Long	Frequent
		June	0.0	4.9-4.9	---	---	None	Long	Frequent
		July	0.8-4.9	4.9-4.9	---	---	None	---	None
		August	0.8-4.9	4.9-4.9	---	---	None	---	None
		September	0.8-4.9	4.9-4.9	---	---	None	---	None
		October	0.8-4.9	4.9-4.9	---	---	None	---	None
		November	0.8-4.9	4.9-4.9	---	---	None	---	None
		December	0.0-3.3	4.9-4.9	---	---	None	---	None
133:									
Toags-----------------------------------	A								
		January-December	---	---	---	---	None	---	None
Pinncamp--------------------------------	A								
		January-December	---	---	---	---	None	---	None
134:									
Toags-----------------------------------	A								
		January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	*Ft*	*Ft*				
135:									
Toags	A								
		January-December	---	---	---	---	None	---	None
Riverwash	A								
		January	0.0	4.9-4.9	---	---	None	Long	Frequent
		February	0.0	4.9-4.9	---	---	None	Long	Frequent
		March	0.0	4.9-4.9	---	---	None	Long	Frequent
		April	0.0	4.9-4.9	---	---	None	Long	Frequent
		May	0.0	4.9-4.9	---	---	None	Long	Frequent
		June	0.0	4.9-4.9	---	---	None	Long	Frequent
		July	0.8-4.9	4.9-4.9	---	---	None	---	None
		August	0.8-4.9	4.9-4.9	---	---	None	---	None
		September	0.8-4.9	4.9-4.9	---	---	None	---	None
		October	0.8-4.9	4.9-4.9	---	---	None	---	None
		November	0.8-4.9	4.9-4.9	---	---	None	---	None
		December	0.0-3.3	4.9-4.9	---	---	None	---	None
136:									
Oxyaquic Haploxerolls, ponded	C								
		January	0.0-0.5	4.9-4.9	0.0-1.0	Long	Frequent	---	None
		February	0.0-0.5	4.9-4.9	0.0-1.0	Long	Frequent	---	None
		March	0.0-0.5	4.9-4.9	0.0-1.0	Long	Frequent	---	None
		April	0.0-0.5	4.9-4.9	0.0-1.0	Long	Frequent	---	None
		May	0.0-0.5	4.9-4.9	0.0-1.0	Long	Frequent	---	None
		June	2.5-4.9	4.9-4.9	---	---	None	---	None
		July	2.5-4.9	4.9-4.9	---	---	None	---	None
		August	2.5-4.9	4.9-4.9	---	---	None	---	None
		September	2.5-4.9	4.9-4.9	---	---	None	---	None
		October	2.5-4.9	4.9-4.9	---	---	None	---	None
		November	2.5-4.9	4.9-4.9	---	---	None	---	None
		December	2.5-4.9	4.9-4.9	---	---	None	---	None
138:									
Rock outcrop, rhyolite or breccia	---	---	---	---	---	---	---	---	---
Highpeaks	D								
		January-December	---	---	---	---	None	---	None
Chalone	B								
		January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
139:									
Highpeaks	D								
		January-December	---	---	---	---	None	---	None
Rock outcrop, rhyolitic breccia	---	---	---	---	---	---	---	---	---
142:									
Ordeal	B								
		January-December	---	---	---	---	None	---	None
Longsfolly	B								
		January-December	---	---	---	---	None	---	None
Passion	C								
		January-December	---	---	---	---	None	---	None
146:									
Badlands, scarps in conglomerate	---	---	---	---	---	---	---	---	---
148:									
Backdoor	B								
		January-December	---	---	---	---	None	---	None
Tuborcio	C								
		January-December	---	---	---	---	None	---	None
152:									
Backdoor	B								
		January-December	---	---	---	---	None	---	None
155:									
Chalone	B								
		January-December	---	---	---	---	None	---	None
Knuckle	D								
		January-December	---	---	---	---	None	---	None
Rock outcrop, rhyolite	---	---	---	---	---	---	---	---	---
156:									
Chalone	B								
		January-December	---	---	---	---	None	---	None

Table 15.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
156:									
Knuckle	D								
		January-December	---	---	---	---	None	---	None
Firstsister	B								
		January-December	---	---	---	---	None	---	None
PgE:									
Pinnacles	C								
		January-December	---	---	---	---	None	---	None
PhG2:									
Pinnacles	C								
		January-December	---	---	---	---	None	---	None
PnE2:									
Pinnacles	C								
		January-December	---	---	---	---	None	---	None
PnG3:									
Pinnacles	C								
		January-December	---	---	---	---	None	---	None
SdG3:									
Santa Lucia	B								
		January-December	---	---	---	---	None	---	None

Table 16.--Soil Features

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

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
101:						
Ordeal	Paralithic bedrock	20-39	Moderately cemented	None	Moderate	Low
Passion	Paralithic bedrock	10-20	Weakly cemented	None	Moderate	Low
Badlands	---	---	---	None	---	---
104:						
Knuckle	Lithic bedrock	10-20	Indurated	None	Low	Moderate
Burgundy	Lithic bedrock	6-10	Indurated	None	Low	Moderate
Argixerolls	Lithic bedrock	20-31	Indurated	None	Moderate	Moderate
105:						
Chalone	Lithic bedrock	20-39	Strongly cemented	None	Low	Moderate
Firstsister	---	---	---	None	Low	Low
Highpeaks	Lithic bedrock	10-20	Indurated	None	Moderate	Low
106:						
Casino	Lithic bedrock	20-39	Indurated	None	High	Moderate
Argixerolls	Lithic bedrock	6-10	Indurated	None	Moderate	Moderate
107:						
Casino	Lithic bedrock	20-39	Indurated	None	High	Moderate
109:						
Rock outcrop, pinnacles of rhyolitic breccia	---	---	---	None	---	---
Highpeaks	Lithic bedrock	10-20	Indurated	None	Moderate	Low
Burgundy	Lithic bedrock	4-10	Indurated	None	Low	Moderate
110:						
Knuckle	Lithic bedrock	10-20	Indurated	None	Low	Moderate
Chalone	Lithic bedrock	20-39	Strongly cemented	None	Low	Moderate
Burgundy	Lithic bedrock	4-10	Indurated	None	Low	Moderate
111:						
Backdoor sandy loam	---	---	---	None	Moderate	Moderate
Backdoor gravelly sandy loam	---	---	---	None	Moderate	Moderate
Tuborcio	Abrupt textural change	8-24	Noncemented	None	Moderate	Moderate
112:						
Rimtrail	---	---	---	None	Moderate	Low
113:						
Elder	---	---	---	None	Low	Low
Oxyaquic Haploxerolls, rarely flooded	---	---	---	None	Low	Low
114:						
Ordeal	Paralithic bedrock	20-39	Strongly cemented	None	Moderate	Low

Table 16.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In				
115:						
Tuborcio	Abrupt textural change	8-24	Noncemented	None	Moderate	Moderate
Passion	Paralithic bedrock	10-20	Weakly cemented	None	Moderate	Low
115:						
Tuborcio	Abrupt textural change	4-8	Noncemented	None	Moderate	Moderate
117:						
Elder	---	---	---	None	Low	Low
119:						
Still	---	---	---	None	High	Low
120:						
Elder	---	---	---	None	Low	Low
122:						
Tuborcio	Abrupt textural change	8-24	Noncemented	None	Moderate	Moderate
123:						
Teapot	---	---	---	None	High	Moderate
Rock outcrop, diatomaceous mudstone	---	---	---	None	---	---
127:						
Argixerolls	Lithic bedrock	20-31	Indurated	None	---	Moderate
Rock outcrop, rhyolite	---	---	---	None	---	---
Chalone	Lithic bedrock	20-39	Strongly cemented	None	Low	Moderate
128:						
Still	---	---	---	None	Moderate	Low
Riverwash	---	---	---	None	---	---
131:						
Firstsister	---	---	---	None	Low	Low
Oxyaquic Haploxerolls, frequently flooded	---	---	---	None	Low	Low
Rock outcrop, rhyolite or breccia	---	---	---	None	---	---
132:						
Toags	---	---	---	None	Moderate	Low
Oxyaquic Haploxerolls, rarely flooded	---	---	---	None	Low	Low
Riverwash	---	---	---	None	---	---
133:						
Toags	---	---	---	None	Moderate	Low
Pinncamp	---	---	---	None	Moderate	Low
134:						
Toags	---	---	---	None	Moderate	Low
135:						
Toags	---	---	---	None	Moderate	Low
Riverwash	---	---	---	None	---	---

Table 16.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In				
136:						
Oxyaquic Haploxerolls, ponded	---	---	---	None	High	Low
138:						
Rock outcrop, rhyolite or breccia	---	---	---	None	---	---
Highpeaks	Lithic bedrock	10-20	Indurated	None	Moderate	Low
Chalone	Lithic bedrock	20-39	Strongly cemented	None	Low	Moderate
139:						
Highpeaks	Lithic bedrock	10-20	Indurated	None	Moderate	Low
Rock outcrop, rhyolitic breccia	---	---	---	None	---	---
142:						
Ordeal	Paralithic bedrock	20-39	Strongly cemented	None	Moderate	Low
Longsfolly	Paralithic bedrock	39-59	Moderately cemented	None	Moderate	Low
Passion	Paralithic bedrock	10-20	Weakly cemented	None	Moderate	Low
146:						
Badlands, scarps in conglomerate	---	---	---	None	---	---
148:						
Backdoor	---	---	---	None	Moderate	Moderate
Tuborcio	Abrupt textural change	8-24	Noncemented	None	Moderate	Moderate
152:						
Backdoor	---	---	---	None	Moderate	Moderate
155:						
Chalone	Lithic bedrock	20-39	Strongly cemented	None	Low	Moderate
Knuckle	Lithic bedrock	6-10	Indurated	None	Low	Moderate
Rock outcrop, rhyolite	---	---	---	None	---	---
156:						
Chalone	Lithic bedrock	20-39	Strongly cemented	None	Low	Moderate
Knuckle	Lithic bedrock	10-20	Indurated	None	Low	Moderate
Firstsister	---	---	---	None	Low	Low
PgE:						
Pinnacles	Abrupt textural change	10-20	Noncemented	None	High	Moderate
	Paralithic bedrock	25-39	Moderately cemented			
PhG2:						
Pinnacles	Abrupt textural change	10-20	Noncemented	None	High	Moderate
	Paralithic bedrock	25-39	Moderately cemented			
PnE2:						
Pinnacles	Abrupt textural change	10-20	Noncemented	None	High	Moderate
	Paralithic bedrock	25-39	Moderately cemented			

Table 16.--Soil Features--Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
PnG3:						
Pinnacles	Abrupt textural change	10-20	Noncemented	None	High	Moderate
	Paralithic bedrock	25-39	Moderately cemented			
SdG3:						
Santa Lucia	Lithic bedrock	20-39	Moderately cemented	None	Low	Moderate

Table 17.--Taxonomic 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
Argixerolls	Argixerolls
Backdoor	Fine-loamy, mixed, active, thermic Typic Argixerolls
Burgundy	Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Xerorthents
Casino	Fine, smectitic, thermic Pachic Argixerolls
Chalone	Loamy-skeletal, mixed, superactive, thermic Typic Haploxerepts
Elder	Coarse-loamy, mixed, superactive, thermic Cumulic Haploxerolls
Firstsister	Loamy-skeletal, mixed, superactive, thermic Pachic Haploxerolls
Highpeaks	Loamy-skeletal, mixed, superactive, thermic Lithic Haploxerolls
Knuckle	Sandy-skeletal, mixed, thermic Lithic Xerorthents
Longsfolly	Sandy, mixed, thermic Entic Haploxerolls
Ordeal	Sandy-skeletal, mixed, thermic Entic Haploxerolls
Oxyaquic Haploxerolls	Oxyaquic Haploxerolls
Passion	Sandy-skeletal, mixed, thermic, shallow Typic Xerorthents
Pinnacles	Fine, smectitic, thermic Ultic Palexeralfs
Pinncamp	Mixed, thermic Psammentic Haploxerolls
Rimtrail	Fine-loamy, mixed, superactive, thermic Pachic Argixerolls
*Santa Lucia	Loamy-skeletal, mixed, superactive, thermic Lithic Ultic Haploxerolls
*Still	Fine-loamy, mixed, superactive, thermic Cumulic Haploxerolls
Teapot	Loamy-skeletal, mixed, superactive, acid, thermic Typic Xerorthents
Toags	Mixed, thermic Typic Xeropsamments
Tuborcio	Fine, mixed, superactive, thermic Ultic Palexerolls

Appendix

Appendix.--Index of Common and Scientific Plant Names and Plant Symbols

Local common name	Scientific name	Plant symbol
annual hairgrass	Deschampsia danthonioides	DEDA
arroyo willow	Salix lasiolepis	SALA6
aster	Aster spp.	ASTER
Baltic rush	Juncus balticus	JUBA
beardless wildrye	Leymus triticoides	LETR5
bigberry manzanita	Arctostaphylos glauca	ARGL4
birchleaf mountain mahogany	Cercocarpus montanus var. glaber	CEMOG
black sage	Salvia mellifera	SAME3
blue elderberry	Sambucus nigra ssp. cerulea	SANIC5
blue oak	Quercus douglasii	QUDO
blue wildrye	Elymus glaucus	ELGL
bluewitch nightshade	Solanum umbelliferum	SOUM
buckbrush	Ceanothus cuneatus	CECU
bulrush	Scirpus ssp.	SCIRP
bushy spikemoss	Selaginella bigelovii	SEBI
California ash	Fraxinus dipetala	FRDI2
California bedstraw	Galium californicum	GACA3
California blackberry	Rubus ursinus	RUUR
California brome	Bromus carinatus	BRCA5
California buckeye	Aesculus californica	AECA
California buckwheat	Eriogonum fasciculatum	ERFA2
California juniper	Juniperus californica	JUCA7
California live oak	Quercus agrifolia	QUAG
California maidenhair	Adiantum jordanii	ADJO
California poppy	Eschscholzia californica	ESCA2
California ragwort	Senecio californicus	SECA
California sagebrush	Artemisia californica	ARCA11
California sycamore	Platanus racemosa	PLRA
California wildrose	Rosa californica	ROCA2
carex	Carex spp.	CAREX
chamise	Adenostoma fasciculatum	ADFA
chaparral clarkia	Clarkia affinis	CLAF
chaparral dodder	Cuscuta californica	CUCA
Chilean bird’s-foot trefoil	Lotus wrangelianus	LOWR2
coast Indian paintbrush	Castilleja affinis	CAAF
coast live oak	Quercus agrifolia	QUAG
common deerweed	Lotus scoparius	LOSC2
coyote willow	Salix exigua	SAEX
coyotebrush	Baccharis pilularis	BAPI
creeping snowberry	Symphoricarpos mollis	SYMO
crinkled onion	Allium crispum	ALCR5
deergrass	Muhlenbergia rigens	MURI2
Douglas sagewort	Artemisia douglasiana	ARDO3
flatsedge	Cyperus spp.	CYPER
foothill pine	Pinus sabiniana	PISA2
Fremont cottonwood	Populus fremontii	POFR2
fringed redmaids	Calandrinia ciliata	CACI2
goldback fern	Pentagramma triangularis	PETR7
hollyleaf cherry	Prunus ilicifolia	PRIL
interior live oak	Quercus wislizeni	QUWI2
larkspur	Delphinium spp.	DELPH
Maltese star-thistle	Centaurea melitensis	CEME2
meadow barley	Hordeum brachyantherum	HOBR2
melic	Melica spp.	MELIC
miners lettuce	Claytonia perfoliata	CLPE
mule’s fat	Baccharis salicifolia	BASA4
nested polypody	Polypodium calirhiza	POCA26
nodding needlegrass	Nassella cernua	NACE
orange bush monkeyflower	Diplacus aurantiacus	DIAU
Pacific poison oak	Toxicodendron diversilobum	TODI
padre’s shootingstar	Dodecatheon clevelandii	DOCL
pipestem clematis	Clematis lasiantha	CLLA3
pointleaf manzanita	Arctostaphylos pungens	ARPU5
prickly sowthistle	Sonchus asper	SOAS

Appendix.--Index of Common and Scientific Plant Names and Plant Symbols--Continued

Local common name	Scientific name	Plant symbol
purple needlegrass	Nassella pulchra	NAPU4
rabbitfootgrass	Polypogon monspeliensis	POMO5
rattail fescue	Vulpia myuros	VUMY
red brome	Bromus rubens	BRRU2
redstem filaree	Erodium cicutarium	ERCI6
ripgut brome	Bromus diandrus	BRDI3
rush	Juncus spp.	JUNCU
Sandberg bluegrass	Poa secunda	POSE
Santa Barbara sedge	Carex barbarae	CABA4
scarlet pimpernel	Anagallis arvensis	ANAR
scrub oak	Quercus berberidifolia	QUBE5
silver hairgrass	Aira caryophyllea	AICA
silver lupine	Lupinus albifrons	LUAL4
smallflower melicgrass	Melica imperfecta	MEIM
smooth catsear	Hypochaeris glabra	HYGL2
soft brome	Bromus hordeaceus	BRHO2
Spanish brome	Bromus madritensis	BRMA3
spikerush	Eleocharis spp.	ELEOC
spring draba	Draba verna	DRVE2
tall annual willowherb	Epilobium brachycarpum	EPBR3
Texas Indian paintbrush	Castilleja foliolosa	CAFO2
toad rush	Juncus bufonius	JUBU
toyon	Heteromeles arbutifolia	HEAR5
tussockgrass	Nassella spp.	NASSE
valley oak	Quercus lobata	QULO
valley popcornflower	Plagiobothrys canescens	PLCA2
wild oat	Avena fatua	AVFA
wild onion	Allium spp.	ALLIU
willow	Salix spp.	SALIX
wooly yerba santa	Eriodictyon tomentosum	ERTO
yellow starthistle	Centaurea solstitialis	CESO3
zigzag larkspur	Delphinium patens	DEPA3

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