United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Catalina Island Conservancy, City of Avalon, and Regents of the University of California (Agricultural Experiment Station)

Soil Survey of Santa Catalina Island, California,

Part of the Soil Survey Area of the Channel Islands (CA688)

How To Use This Soil Survey

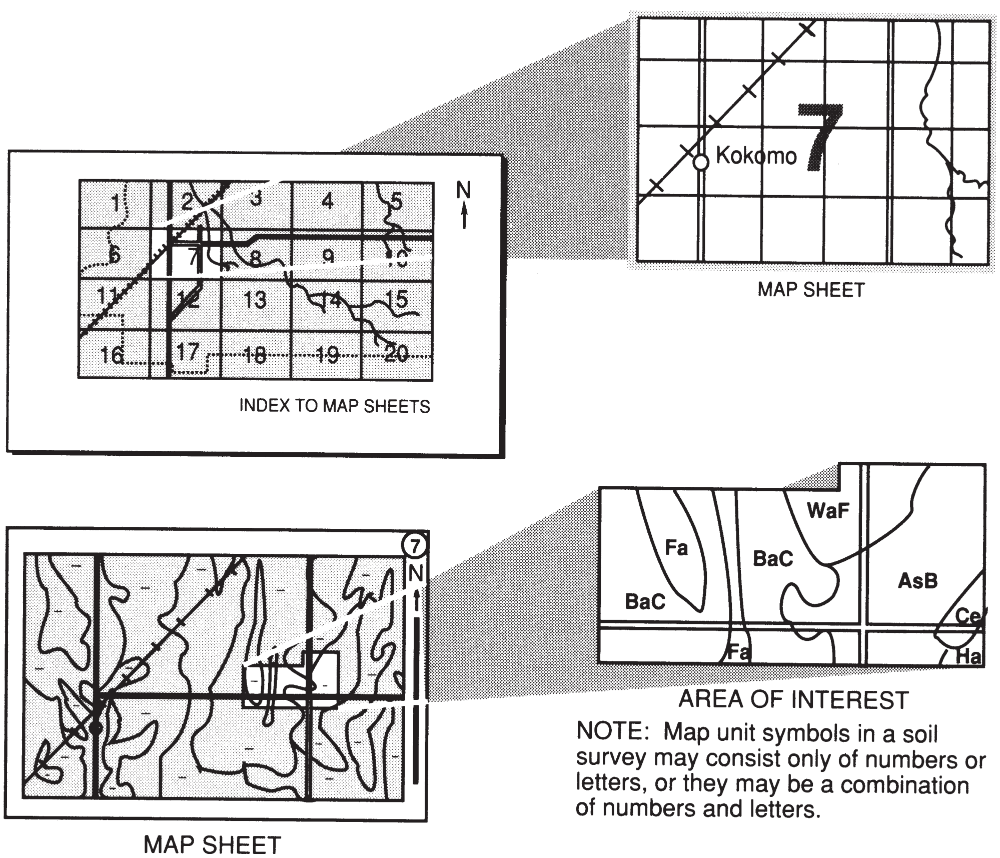
Detailed Soil Maps

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

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

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

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



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. This survey was made cooperatively by the Natural Resources Conservation Service, the Catalina Island Conservancy, the City of Avalon, and the Regents of the University of California (Agricultural Experiment Station).

Major fieldwork for this soil survey was completed in 2007. Soil names and descriptions were approved in 2007. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2007. The most current official data are available on the Internet.

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. The soil maps 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. 2008. Soil survey of Santa Catalina Island, California.

Cover Caption

Looking north across Middle Canyon ranch to Cape Canyon and Black Jack Mountain.

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

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Issued 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 many different users. Natural resource users, managers, and agronomists can use it to evaluate the potential of the soil and the management needed for land use and conservation. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, 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 map unit 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 E. Burton
State Conservationist
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Soil Survey of
Santa Catalina Island, California, Part of the Soil Survey Area of the Channel Islands (CA688)

By Matthew Ballmer, United States Department of Agriculture, Natural Resources Conservation Service

Fieldwork by Matthew Ballmer

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Catalina Island Conservancy, the City of Avalon, and the Regents of the University of California (Agricultural Experiment Station)

Santa Catalina Island is one of the eight Channel Islands, a coastal archipelago in southern California (fig. 1). It is directly southwest of the Palos Verdes Peninsula. The closest distance from the mainland is about 20 miles from Point Fermin Park, California. Catalina Island is positioned parallel to the coast. It is 20 miles long from west to east and has a maximum width of approximately 7.8 miles and an isthmus of just 0.4 mile. It has an area of 48,400 acres, or about 75.6 square miles. It is in Los Angeles County. Of the California Channel Islands, Santa Catalina Island has the second largest amount of privately owned land. Several of the northern islands were entirely privately owned until the National Park System assumed ownership and began managing them. The Nature Conservancy owns 76 percent of Santa Cruz Island (46,694 acres). Its role and mission are similar to those of the Catalina Island Conservancy, which owns 88 percent of Catalina Island (42,592 acres). While protecting thousands of acres for recreation and natural resource conservation, the Catalina Island Conservancy helped to develop a new model for preserving open space by establishing a business model of “eco-tourism.”

Santa Catalina Island has approximately 3,500 permanent residents and is the only Channel Island with a municipal town. The island draws over one million tourists annually. In comparison, the Channel Islands National Park has less than 100 permanent residents on five islands. The impact from visitors, campers, and researchers is much less on Santa Catalina Island than in the park.

Recreation, management of wildlife habitat, education, and natural resources management are the main enterprises on Santa Catalina Island today.

The soils of Santa Catalina Island range widely in texture, natural drainage, and other characteristics. These variations are related mostly to differences in the geochemistry and type of parent material, the types of landforms, and the relative landscape position.

General Nature of the Survey Area

This section provides general information about Santa Catalina Island. It describes history and development; physiography, relief, and drainage; water supply; and climate.

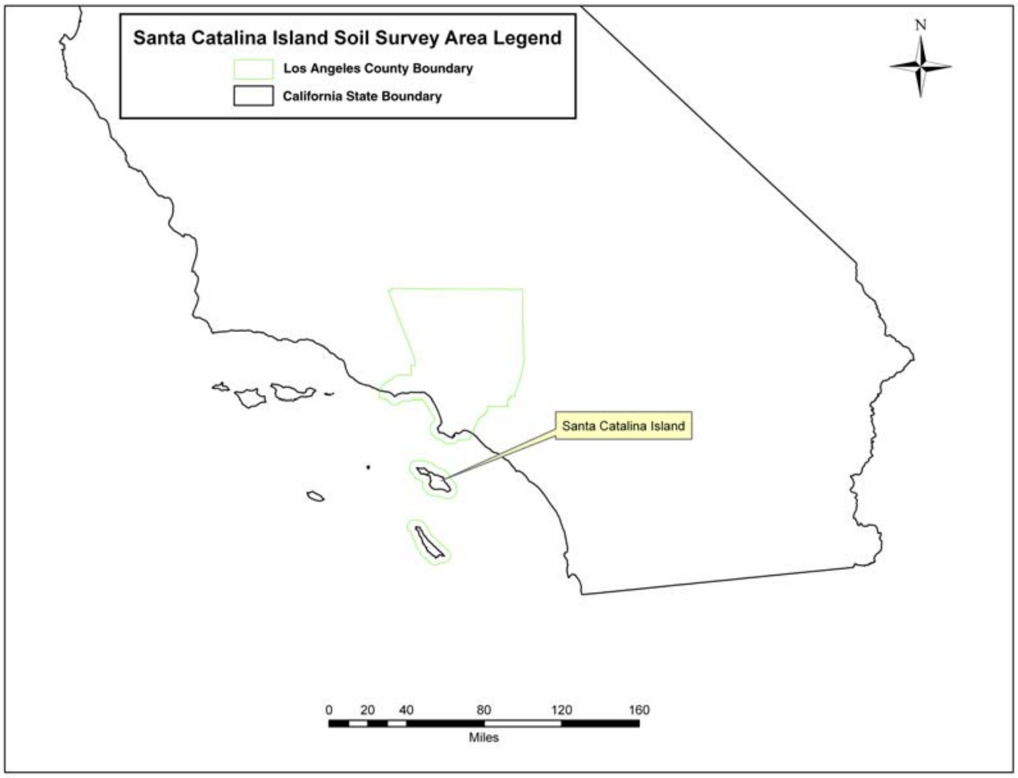

Figure 1.—Location of Santa Catalina Island, California.

History and Development

The Channel Islands of California have a history of continuous human occupation dating back more than 11,000 years. Two different Native American groups inhabited the Channel Islands and the southern California coast. The Chumash occupied the northern Channel Islands and parts of the coast up to the San Luis Obispo area. The Gabriellino (Tongva) people occupied the southern Channel Islands and parts of the adjacent mainland. They had similar cultures but spoke different languages. More than 3,000 recorded archeological sites on the islands are evidence of the villages, temporary camps, industrial sites, and other vestiges of human use and occupation of the islands. Sites continue to be discovered. On Santa Catalina Island, the Gabriellino mined steatite rock, also known as soapstone.

The most significant impacts on soils during the periods before modern-day settlement occurred in the large villages, where anthropic epipedons formed. Anthropic epipedons are dark surface layers commonly referred to as middens or cultural resources. They formed during long, continuous use by humans, are generally considered to be high in content of organic material, and commonly have shell fragments from the ocean or other artifacts of human presence.

In 1542, Juan Rodriguez Cabrillo was the first European explorer to visit the islands. During the next two centuries, Spanish, French, English, and other navigators traveled through the Santa Barbara and San Pedro channels. They noted their impressions of and named the islands in letters and diaries. Spanish colonization in the 1700s and early 1800s established towns, army garrisons, and Catholic missions along the California coast. By 1822, all of the Chumash and Gabriellino had left or been removed from the islands and were living on the mainland in missions or other communities.

In 1846, four years before California became a State, Governor Pio Pico deeded the island of Santa Catalina to the first private title holder, Thomas Robbins of Santa Barbara. During the American Civil War, an army outpost was stationed at the isthmus of Catalina for nine months to regulate possible supply smugglers working with the Confederate Army. Numerous owners have held title to the island, and business speculators invested in its resources and enterprises, which have included real estate, fishing, wild game, film making, ranching, mining, boarding schools, luxury resorts, and recreation.

Santa Catalina Island was mined for geologic resources more than any of the other Channel Islands. For centuries, the native Gabriellino people mined steatite and serpentine rock for tools and traded it across the mainland. In 1792, a Spaniard at the San Gabriel Mission observed that the Gabriellino people of Santa Catalina Island carried galena pebble amulets (Probert, 1982). Many mining enterprises sought the argentiferous zinc-lead deposits known as “galena.” The first recorded mine claim on the island was in 1863, by the San Pedro Mining District (Probert, 1982). In 1919, William Wrigley, Jr., pioneered a large galena-extraction operation. He also mined the fine talc clay, originating from the steatite parent material, to support a house-ware pottery industry, located at Pebbly Beach, near Avalon. Construction grade rock has been mined from two large quarries, one still in operation at the northeast end of the island. Amethyst occurs on the western end of the island. Near the Airport in the Sky, rare outcrops of garnet amphibolite occur. Santa Catalina Island is the only Channel Island that has surface deposits of the State rock, serpentinite.

Like the other Channel Islands, Santa Catalina Island was used for traditional ranching operations. Grazing by cattle (*Bos taurus*) and sheep (*Ovis aries*) began in the mid 1800s. All the sheep were removed in the early 1920s after William Wrigley, Jr., purchased the island in 1919. Domestic cattle were managed until about 1960. Wrigley’s vision for the island included game hunting, so mule deer and feral pigs were introduced in the early and mid 1930s (Sweitzer and others, 2005).

In 1972, Philip K. Wrigley, the last private individual to own the island, established the nonprofit Santa Catalina Island Conservancy with the Offield family. Through negotiations with Los Angeles County, the conservancy now ensures that about 88 percent of the island will remain an undeveloped nature preserve. The mission of the conservancy is to serve as responsible stewards of the island through a balance of conservation, education, and recreation.

Physiography, Relief, and Drainage

The dominant landforms on Catalina Island are steep, dissected mountains and hills with watersheds that drain laterally northeast and southwest. The highest elevation is the summit of Mount Orizaba, which rises 2,125 feet from the nearby ocean. Silver Peak, on the west end of the island, reaches an elevation of 1,804 feet. The island has a few intervening valleys, made up of appreciable alluvial deposits, with narrow footslopes and flood deposits. These are Avalon Canyon, Middle Canyon, Cottonwood Canyon, Cape Canyon, Silver Canyon, and Bullrush Canyon.

Many of the steep side slopes end abruptly in narrow drainageways. In some areas, such as the east end, these drainageways form curved, continuous S shapes as they gather material from the side slopes (fig. 2). This curving feature indicates that the side slopes are losing material at a faster rate than material is being carried away in the drainageways directly below. The feature also is characteristic of the quartz parent material, which is less resilient than metamorphic schist rock. Some of these drainageways are undergoing a rise in their base levels or a filling sequence.

The northern coast of Santa Catalina Island has many large alluvial deposits that meet the shoreline. These accommodate many beach fronts and camps (fig. 3). The alluvial flats formed between the footslopes of mountains with considerable size and

Figure 2.—The S-shaped drainageways and narrow V-shaped bottoms of hills in an area of the Flyer-Loadline-Nauti complex, 15 to 50 percent slopes. The soils in this unit are naturally eroded more quickly than the material is transported through the drainageways.

steep watersheds. They also are adjacent to the ocean and the tidal zones. Local flooding can occur at the mouths of these drainageways during periods of heavy rainfall, tidal waves, or other high ocean surf.

The presence of marine terraces near the shoreline or elevated elsewhere on the island was not substantiated by any investigations and descriptions of the soil and landscape relationships. Other researchers have recently presented information confirming well formed, wave-cut marine terraces below the current ocean surface (Davis, 2004) and above the surface on the east end (Schoenherr, 1999), suggesting that these formations occur on Catalina Island. In many areas the island has a stepped appearance in which horizontal surfaces resemble the landform associated with the common Pleistocene coastal terrace. Also, there is evidence of remnant soils on certain landforms, including the broad crests of interfluves, saddles, and even some of the steeper side slopes. One area has a considerable accumulation of moderately cemented calcium carbonate beneath a highly weathered Vertic soil, relative evidence that not all of these landforms are actively eroding. The carbonates, however, could be from an eolian source. Eolian carbonate source materials are not widespread on the island.

From a distance, some areas on the island resemble relicts of the broader marine terrace landform, either wave-cut or uplifted deposits (fig. 4). These are consistently explained, however, by other phenomenon, such as differential erosion, fluvial terraces, or artifacts from midden sites. The highly mobile and unstable geologic substrate demonstrates that these landforms may not be easily identifiable. The possibility of confusing the horizontal step features of the terrace landform with those characteristic of the massive block landslides common to the Catalina parent material

Figure 3.—Sullivans Beach, west of Two Harbors, below a large watershed. The large alluvial plain can absorb floodwater better than can plains with narrow outlets.

Figure 4.—Between Mount Banning and Little Harbor, the flat, broad summits (delineated by red lines) of map units 182, 420, and 423 look deceptively like terrace structures.

will continue until true marine evidence is found (Davis, 2004; White and others, 2004).

A lack of convincing evidence of Pleistocene marine terraces on Catalina Island suggests an insignificant rate of uplift compared to the rate of erosion. This characteristic is contrary to the phenomenon on nearby San Clemente Island. A lack of substantial evidence leaves the marine terrace question ambiguous.

The dominant orientation of drainageways on the island is from north to south. From Avalon Canyon to the west, the major drainageways parallel each other (fig. 5). The natural drainage patterns of the mountains suggest indelible stories of the formation of the island and the current movement of material. The most noticeable feature is the abrupt turn to the west of the drainageways in the southeast corner of the island. The fulcrum point of a major stretch of the island extends from above Middle Ranch east to Silver Canyon. Because of the geologic formation forces still acting on Santa Catalina Island today, the right-lateral faults of the San Clemente Basin and the San Pedro Basin are continuing to bend the southeast corner to the west (Legg and others, 2004).

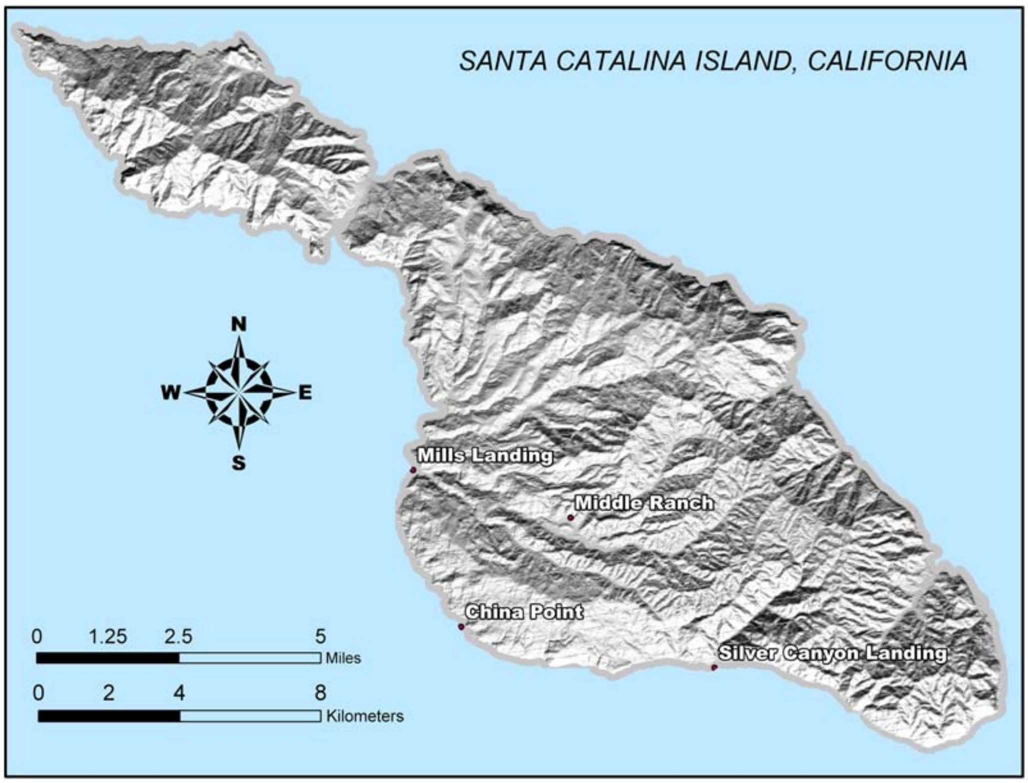

Figure 5.—Typically, the drainage patterns of Santa Catalina Island run northeast to southwest. This image demonstrates these and also the east-west drainage pattern created by two major parallel right-lateral faults. Bending of the southwest corner of the island, between Middle Ranch and Silver Canyon Landing, is evidence of the southern San Clemente fault pulling west. The northern San Pedro fault is pulling east. These faults are deep below the ocean and parallel the island approximately 15 kilometers to the north and 20 kilometers to the southwest. This geomorphic process creates unstable soils and landforms from Silver Canyon west to Mills Landing.

Water Supply

The water supply on Santa Catalina Island comes from ground-water sources and a desalinization plant. Middle Canyon was dammed in an effort to maintain adequate hydrostatic pressure in the interior aquifer. Numerous check dams and water reservoirs were constructed for ranching and wildlife purposes. Many of these contain water throughout the year. Some were named after construction. Examples are Cape Canyon, Buffalo Springs, and Upper and Lower Buffalo Corral Reservoirs. Several in Middle and Cape Canyons remain unnamed and unmapped.

Perennial streams and seeps are evident throughout the island for many weeks after the rainy season. In many areas in Bullrush, Cottonwood, and Middle Canyons, water is available throughout the year. The island has only one natural perennial lake, named Echo Lake. This lake is at an elevation of approximately 1,300 feet. It is below Fletcher Peak and between the Airport in the Sky and Whites Landing.

Climate

Prepared by the National Water and Climate Center, Natural Resources Conservation Service, Portland, Oregon, and amended by Matthew Ballmer, Soil Scientist, Natural Resources Conservation Service.

Climate data were summarized from field investigations during the survey. Historical data were collected by the Western Regional Climate Center, Portland, Oregon, and the Southern California University Campus, Two Harbors, Santa Catalina Island. Comprehensive weather data for eight climate stations can be accessed online through the Western Regional Climate Center (http://www.wrcc.dri.edu/catalina/).

Santa Catalina Island has a Mediterranean climate that is characterized by warm, dry summers and cool, moist winters and commonly by year-round fog. The climate is largely controlled by the ocean currents and mainland pressure gradients. The currents are driven by the prevailing northwesterly winds and subtropical storms. As the ocean currents flow south around Point Conception, they follow the coast of California as it turns eastward. During the summer and fall, subtropical storms from the Equator push warm air and water north and over the mainland. The geographic area of the California Channel Islands is a convergence zone that produces an environment rich with marine life and an array of weather patterns.

The combination of topography, coastal profile, and large atmospheric pressure gradients creates a local phenomenon known as the “coastal eddy.” The effects of the coastal eddy are more prevalent in the northern Channel Islands as it centralizes around Point Conception. Santa Catalina Island, however, is affected by this weather pattern, which includes strong northwest winds that create the onshore airflow. Thick, low fog following diurnal patterns of heating and cooling is common when the eddy effect declines and as the airflow stabilizes when high pressures settle over the nearby Mojave Desert. The southern coast of Santa Catalina Island is often more foggy as prevailing fog banks move in from the Pacific Ocean, leaving the northern leeward side clear (figs. 6 and 7). Fog layers can occur at limited elevations, many times occurring only at low elevations while the soils and landscapes above are exposed to completely different weather.

The Channel Islands are subject to offshore (Santa Ana) winds from the northeast. These winds occur regularly when there is a relative low pressure over the eastern Pacific Ocean near southern California and a high pressure centered over the Great Basin (Muhs and others, 2007). The resulting gradient produces northerly and northeasterly winds over the Mojave Desert, the southern California coast, and Baja California. These winds travel in excess of 10 m/s and have gusts up to 35 m/s (Muhs

Figure 6.—Incoming fog in the Escondido Ranch area above Shark Harbor.

Figure 7.—A large, low elevation layer of fog encompassing Santa Catalina and San Clemente Islands.

and others, 2007). Wind is a major factor affecting the climate regime and soil formation on the island.

Catalina Island is warmer and less windy than San Miguel Island, the coolest, windiest, and foggiest of the Channel Islands. On San Miguel Island, frost occurs very rarely and for short periods. It does occur on all of the Channel Islands. On Santa Catalina Island, it occurs on a few days during the year; it occurs for short periods in the mornings on the interior hillsides and valleys of Bullrush Canyon, in Middle Ranch Valley, and on Escondido Ranch. Each winter, freezing temperatures occur for very brief periods in interior valleys and deep drainageways or draws. Fog is less common on the interior hills than along the coast, but it has occurred in low valleys, where it formed by local temperature inversion layers. Frost-free periods range from 355 days in interior valleys and on the higher peaks to 365 days in areas along the coast. Coastal areas are much less susceptible to frost.

The presence of “iso” soil temperature regimes has been documented on Santa Catalina and Santa Cruz Islands by in situ site data (Ballmer, 2008). The “iso” regimes are attributed to the buffering effect of the ocean and its proximity to the Channel Islands. Large bodies of water increase the relative humidity and moderate air and soil temperatures to lower extremes (Taylor, 2003). Much of the data show that soil temperatures are within only 1 degree C of the regime classification. Climate ranges are on the boundaries of regime classifications and could vary within a significant period of time. Data used for classification of these temperature regimes were collected for only 1 year.

On the north-facing slopes of hills and mountains, which receive less direct sunlight and solar radiation than the south-facing slopes, mean annual air temperatures are 59 to 63 degrees F (15 to 17 degrees C) and the soil temperature regime is commonly isothermic. Isothermic regimes occur on the south-facing slopes where there is a sufficient cover of oak woodland or chaparral to provide shade and cooling. The remaining areas of Santa Catalina Island have thermic temperature regimes with average annual air temperatures of 61 to 72 degrees F (16 to 22 degrees C).

Annual precipitation ranges from 4 to 17 inches (102 to 432 millimeters) on the island. It can vary greatly geographically, depending on orographic factors. Almost all of the rainfall occurs during the period November to April on all of Santa Catalina Island. Summer thunderstorms occur but are rare.

How This Survey Was Made

This survey was made in conjunction with the National Park Service’s Soil Inventory and Monitoring Program to provide information about the soils and miscellaneous areas on Catalina Island. 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 occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed.

Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

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

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

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

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

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

Detailed Soil Map Units

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

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

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

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

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

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. 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. Masthead-Coastwise-Dewpoint complex, 20 to 55 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Dewpoint-Luff association, 15 to 45 percent slopes, is an example.

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

Table 1 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

156—Tongva-Freeboard-Starbright complex, 30 to 55 percent slopes

Map unit setting

General location: Cape Canyon, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 750 to 1,615 feet (230 to 493 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Tongva and similar soils—40 percent
Freeboard and similar soils—30 percent
Starbright and similar soils—15 percent
Minor components—15 percent

Characteristics of Tongva and similar soils

Slope: 30 to 55 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, and Island Chaparral
pH in the surface layer: 5.8
Percentage of the surface covered by rock fragments: 0 to 30 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Moderately slow above the bedrock

Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.8 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oe—0 to 1 inch; moderately decomposed plant material
A1—1 to 4 inches; loam
A2—4 to 16 inches; loam
Bt—16 to 30 inches; gravelly clay loam
Cr—30 to 31 inches; soft bedrock

Characteristics of Freeboard and similar soils

Slope: 30 to 55 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: Coastal Sage Scrub and Grassland
pH in the surface layer: 7.0
Percentage of the surface covered by rock fragments: 0 to 15 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—39 to 59 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 7.4 inches (moderate)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 1 inch; clay loam

A2—1 to 5 inches; clay
Bt1—5 to 11 inches; clay loam
Bt2—11 to 24 inches; clay loam
Btk1—24 to 35 inches; gravelly sandy clay loam
Btk2—35 to 51 inches; very gravelly sandy loam
Cr—51 to 59 inches; soft bedrock

Characteristics of Starbright and similar soils

Slope: 30 to 55 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: None assigned
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 0 to 15 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—39 to 43 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 6.0 inches (moderate)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 8 inches; gravelly loam
Bt1—8 to 12 inches; loam
Bt2—12 to 16 inches; clay loam
Bt3—16 to 28 inches; clay
Bt4—28 to 33 inches; clay loam
Bt5—33 to 43 inches; clay loam
Crt—43 to 53 inches; soft bedrock

Minor Components

Pachic Argixerolls and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 15 to 60 percent
Landform:
Shoulders of interfluves on dissected hills
Shoulders and crests on dissected hills
Backslopes of interfluves on dissected hills
Backslopes and crests on dissected hills

Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 4 percent
Landform:
Drainageways
Side slopes of dissected hills
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Luff and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 2 to 60 percent
Landform:
Shoulders and crests on dissected hills
Backslopes and crests on dissected hills
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Starboard and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 15 to 60 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Toeslopes of interfluves on dissected hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Topdeck and similar soils
Percentage of component in the map unit: About 1 percent
Slope: 15 to 60 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typic Haploxeralfs and similar soils
Percentage of component in the map unit: About 1 percent
Slope: 2 to 60 percent
Landform:
Toeslopes of drainageways
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

157—Tongva-Pachic Argixerolls-Freeboard complex, 55 to 75 percent slopes

Map unit setting

General location: Cape Canyon to Channel Islands Marine Institute, Toyon Bay, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains on islands
Elevation: 0 to 1,455 feet (0 to 445 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Tongva and similar soils—40 percent
Pachic Argixerolls and similar soils—30 percent
Freeboard and similar soils—15 percent
Minor components—15 percent

Characteristics of Tongva and similar soils

Slope: 55 to 75 percent
Landform:
Mountains
Backslopes of mountain flanks
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 7.0
Percentage of the surface covered by rock fragments: 0 to 15 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Moderately slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.7 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bt1—4 to 11 inches; loam
Bt2—11 to 21 inches; clay loam
Bt3—21 to 26 inches; gravelly sandy clay loam
Crt—26 to 36 inches; soft bedrock

Characteristics of Pachic Argixerolls and similar soils

Slope: 55 to 75 percent
Landform:
Mountains
Backslopes of mountain flanks
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.8

Percentage of the surface covered by rock fragments: 1 to 10 percent by stones, 1 to 25 percent by cobbles, and 10 to 40 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.5 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification:
IC, Scrub Communities-Island Chaparral
CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 2 inches; loam
A2—2 to 7 inches; gravelly loam
Bt1—7 to 16 inches; very gravelly clay loam
Bt2—16 to 35 inches; extremely gravelly sandy loam
Cr—35 to 39 inches; soft bedrock

Characteristics of Freeboard and similar soils

Slope: 55 to 75 percent
Landform:
Backslopes of mountain flanks
Mountains
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: Coastal Sage Scrub and Grassland
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 0 to 15 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—39 to 59 inches
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 5.3 inches (moderate)
Shrink-swell potential: High (LEP of 6 to 9)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification:
GR, Herbaceous Communities-Valley and Foothill Grassland
CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 8 inches; loam
Bt1—8 to 35 inches; clay loam
Bt2—35 to 41 inches; clay loam
BC—41 to 43 inches; gravelly sandy clay loam
Cr—43 to 47 inches; soft bedrock

Minor Components

Starbright and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 30 to 75 percent
Landform:
Mountains
Backslopes of mountain flanks
Vegetative classification:
IC, Scrub Communities-Island Chaparral
IW, Woodland Communities-Island Woodland

Rock outcrop
Percentage of component in the map unit: About 3 percent
Landform:
Drainageways
Flanks of mountains
Side slopes on mountains
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Topdeck and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 15 to 60 percent
Landform:
Backslopes of mountain flanks
Mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Purser and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 15 to 30 percent
Landform:
Mountains
Backslopes of mountain flanks
Vegetative classification:
CSS, Scrub Communities-Coastal Sage Scrub
GR, Herbaceous Communities-Valley and Foothill Grassland

Starboard and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 15 to 35 percent
Landform:
Mountains
Backslopes of mountain flanks

Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

160—Beaches-Abaft complex, 0 to 5 percent slopes

Map unit setting

General location: Channel Islands National Park, Santa Cruz Island; Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Dune fields on islands
Elevation: 0 to 310 feet (1 to 95 meters)
Mean annual precipitation: 13 to 34 inches (330 to 864 millimeters)
Mean annual air temperature: 61 to 73 degrees F (16 to 23 degrees C)
Frost-free period: 320 to 365 days

Map unit composition

Beaches—75 percent
Abaft and similar soils—15 percent
Minor components—10 percent

Characteristics of Beaches

Slope: 0 to 5 percent
Landform:
  Risers on dunes
Kind of material: Sandy alluvium derived from sandstone
Typical vegetation: Chaparral

Interpretive groups
  Land capability classification (nonirrigated areas): 8
  Vegetative classification: SBD, Marine Associated Communities—Southern Beach and Dune

Characteristics of Abaft and similar soils

Slope: 0 to 5 percent
Landform:
  Treads on dunes
Parent material: Sandy eolian material derived from volcanic and sedimentary rocks
Typical vegetation: Beach and Dune plant community; red sand verbena, beach bur, and beach suncup are common; prostrate coastal goldenbush and silver lupine are in the more stabilized areas.
pH in the surface layer: 7.0
Percentage of the surface covered by rock fragments: 0 percent
Restrictive feature: None noted
Slowest permeability class: Rapid
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.1 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: High

Selected hydrologic properties
  Present annual flooding: None
  Present annual ponding: None
  Surface runoff class: Negligible
  Current water table: None noted

Natural drainage class: Excessively drained
Hydrologic soil group: A

Interpretive groups
Land capability classification (nonirrigated areas): 4e
Vegetative classification: Not assigned

Typical profile
A1—0 to 5 inches; loamy sand
A2—5 to 13 inches; loamy sand
C—13 to 59 inches; loamy sand

Minor Components

Rock outcrop
Percentage of component in the map unit: About 10 percent
Landform:
Beaches
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

181—Haploxerepts-Purser-Rock outcrop complex, 40 to 75 percent slopes

Map unit setting

General location: Top of Mount Orizaba, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains on islands
Elevation: 445 to 2,085 feet (136 to 636 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Haploxerepts and similar soils—40 percent
Purser and similar soils—30 percent
Rock outcrop—15 percent
Minor components—15 percent

Characteristics of Haploxerepts and similar soils

Slope: 40 to 75 percent
Landform:
Backslopes of mountain flanks
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: None assigned
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 35 to 50 percent by medium, rounded gravel; 0 to 15 percent by rounded cobbles; and 0 to 5 percent by rounded stones
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Moderately slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.8 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 1 inch; loamy sand
Bw—1 to 16 inches; very gravelly sandy loam
BC—16 to 30 inches; very gravelly sandy loam
Cr—30 to 79 inches; soft bedrock

Characteristics of Purser and similar soils

Slope: 40 to 75 percent
Landform:
Interfluves on mountain flanks
Backslopes on mountains
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: None assigned
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 30 to 45 percent by coarse, subrounded gravel; 5 to 10 percent by subrounded cobbles; and 0 to 5 percent by subrounded stones
Depth to a restrictive feature: Lithic bedrock—8 to 20 inches
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 1.7 inches (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 4 inches; gravelly loam
Bt—4 to 15 inches; gravelly clay loam
R—15 to 16 inches; bedrock

Characteristics of Rock outcrop

Landform:
Drainageways

Interfluves on mountain flanks
Kind of material: Volcanic rock and/or andesite
Typical vegetation: None assigned

Interpretive groups
Land capability classification (nonirrigated areas): 8
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Minor Components

Luff and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 50 to 75 percent
Landform:
Interfluves on mountain flanks
Backslopes on mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Tongva and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 50 to 75 percent
Landform:
Interfluves on mountain flanks
Backslopes on mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typic Xerofluvents and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 2 to 75 percent
Landform:
Drainageways
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Topdeck and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 15 to 60 percent
Landform:
Interfluves on mountain flanks
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

182—Luff-Haploxerepts-Haploxeralfs complex, 15 to 35 percent slopes

Map unit setting

General location: The lower part of Mount Orizaba, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 0 to 1,975 feet (0 to 602 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Luff and similar soils—35 percent
Haploxerepts and similar soils—30 percent

Haploxeralfs and similar soils—20 percent
Minor components—15 percent

Characteristics of Luff and similar soils

Slope: 15 to 35 percent
Landform:
    Shoulders of interfluves on hills
    Backslopes of interfluves on hills
Parent material: Eolian deposits over residuum weathered from volcanic and metamorphic rocks
Typical vegetation: None assigned
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 0 to 15 percent by coarse gravel
Depth to restrictive features: Abrupt textural change—4 to 33 inches; lithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 1.2 inches (very low)
Shrink-swell potential: High (LEP of 6 to 9)
Potential for soil slippage: High

Selected hydrologic properties
    Present annual flooding: None
    Present annual ponding: None
    Surface runoff class: Very high
    Current water table: None noted
    Natural drainage class: Well drained
    Hydrologic soil group: D

Interpretive groups
    Land capability classification (nonirrigated areas): 7e
    Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
    A1—0 to 4 inches; gravelly silt loam
    A2—4 to 10 inches; very gravelly silt loam
    2Bt1—10 to 22 inches; clay
    2Bt2—22 to 26 inches; clay
    2R—26 to 39 inches; bedrock

Characteristics of Haploxerepts and similar soils

Slope: 15 to 35 percent
Landform:
    Backslopes of interfluves on hills
    Shoulders of interfluves on hills
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: None assigned
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 10 to 50 percent by coarse, subrounded gravel; 0 to 15 percent by subrounded cobbles; and 0 to 5 percent by subrounded stones
Depth to a restrictive feature: Paralithic bedrock—39 to 59 inches
Slowest permeability class: Slow
Salinity: Not saline

Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.3 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 3 inches; sandy loam
A2—3 to 11 inches; gravelly sandy loam
Bw1—11 to 19 inches; very gravelly loam
Bw2—19 to 31 inches; extremely gravelly loam
Bw3—31 to 41 inches; extremely gravelly loamy sand
Cr—41 to 79 inches; soft bedrock

Characteristics of Haploxeralfs and similar soils

Slope: 15 to 35 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: None assigned
pH in the surface layer: 6.4
Percentage of the surface covered by rock fragments: 0 to 10 percent by cobbles and 5 to 15 percent by coarse gravel
Restrictive feature: None noted
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 8.4 inches (high)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification:
B, Non-Vegetated Areas-Bare Ground
CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 1 inch; clay loam
Bt1—1 to 16 inches; clay
Bt2—16 to 26 inches; clay
Bt3—26 to 39 inches; clay
Bt4—39 to 79 inches; gravelly clay loam

Minor Components

Freeboard and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 15 to 35 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Tongva and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 15 to 60 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 2 percent
Landform:
Drainageways
Interfluves on hills
Side slopes of hills
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Starboard and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 15 to 60 percent
Landform:
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Topdeck and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 15 to 60 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typic Xerofluvents and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 2 to 35 percent
Landform:
Drainageways
Toeslopes of hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

183—Purser-Luff complex, 15 to 35 percent slopes

Map unit setting

General location: Two Harbors, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 0 to 1,030 feet (0 to 314 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Purser and similar soils—55 percent
Luff and similar soils—25 percent
Minor components—20 percent

Characteristics of Purser and similar soils

Slope: 15 to 35 percent
Landform:
  Backslopes of interfluves on hills
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: None assigned
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 0 to 40 percent by coarse gravel, 0 to 15 percent by cobbles, and 0 to 5 percent by stones
Depth to a restrictive feature: Lithic bedrock—8 to 20 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 1.7 inches (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
  Present annual flooding: None
  Present annual ponding: None
  Surface runoff class: Very high
  Current water table: None noted
  Natural drainage class: Well drained
  Hydrologic soil group: D

Interpretive groups
  Land capability classification (nonirrigated areas): 7e
  Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
  A—0 to 2 inches; clay loam
  Bt—2 to 15 inches; clay
  R—15 to 24 inches; bedrock

Characteristics of Luff and similar soils

Slope: 15 to 35 percent
Landform:
  Backslopes of interfluves on hills

Parent material: Eolian deposits over residuum weathered from volcanic and metamorphic rocks
pH in the surface layer: 5.3
Percentage of the surface covered by rock fragments: 0 to 15 percent by coarse gravel
Depth to restrictive features: Abrupt textural change—4 to 33 inches; lithic bedrock—20 to 59 inches
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 1.3 inches (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: High

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Medium
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A1—2 to 4 inches; gravelly loam
A2—4 to 13 inches; gravelly loam
2Bt1—13 to 22 inches; clay
2Bt2—22 to 35 inches; clay
2R—35 to 79 inches; bedrock

Minor Components

Freeboard and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 15 to 35 percent
Landform:
Backslopes of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Haploxeralfs and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 15 to 35 percent
Landform:
Backslopes of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Starbright and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 15 to 35 percent
Landform:
Backslopes of interfluves on hills
Footslopes of interfluves on hills
Vegetative classification: Not assigned

Rock outcrop
Percentage of component in the map unit: About 2 percent
Landform:
  Drainageways
  Side slopes of hills
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

184—Dewpoint-Luff association, 15 to 45 percent slopes

Map unit setting

General location: Two Harbors, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains on islands
Elevation: 0 to 1,210 feet (0 to 369 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Dewpoint and similar soils—45 percent
Luff and similar soils—30 percent
Minor components—25 percent

Characteristics of Dewpoint and similar soils

Slope: 15 to 45 percent
Landform:
  Mountain flanks, upper third; interfluves
  Backslopes on mountains
Parent material: Material weathered from volcanic breccia, andesite, or basalt
Typical vegetation: Oak Woodland, Island Chaparral, Southern Riparian Herbaceous, and Non-Native Woodland
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 0 to 15 percent by stones, 0 to 15 percent by boulders, 0 to 15 percent by cobbles, and 0 to 15 percent by coarse gravel
Depth to a restrictive feature: Lithic bedrock—22 to 39 inches
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.6 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: High

Selected hydrologic properties
  Present annual flooding: None
  Present annual ponding: None
  Surface runoff class: High
  Current water table: None noted
  Natural drainage class: Well drained
  Hydrologic soil group: C

Interpretive groups
  Land capability classification (nonirrigated areas): 7e

Vegetative classification:
CSS, Scrub Communities-Coastal Sage Scrub
IW, Woodland Communities-Island Woodland

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 2 inches; silt loam
Bt1—2 to 19 inches; clay
Bt2—19 to 24 inches; clay
Bt3—24 to 29 inches; silty clay loam
R—29 inches; bedrock

Characteristics of Luff and similar soils

Slope: 15 to 45 percent
Landform:
Mountain flanks, lower third interfluves
Backslopes on mountains
Parent material: Eolian deposits over residuum weathered from volcanic and metamorphic rocks
Typical vegetation: Oak Woodland, Island Chaparral, Southern Riparian Herbaceous, and Non-Native Woodland
pH in the surface layer: 6.3
Percentage of the surface covered by rock fragments: 5 to 20 percent by coarse gravel
Depth to restrictive features: Abrupt textural change—1 to 2 inches; lithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 0.1 inch (very low)
Shrink-swell potential: High (LEP of 6 to 9)
Potential for soil slippage: High

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 6e
Vegetative classification: GR, Herbaceous Communities-Valley and Foothill Grassland

Typical profile
A—0 to 1 inch; silt loam
2Btss—1 to 6 inches; clay
2Bt—6 to 20 inches; very gravelly clay
2R—20 to 39 inches; bedrock

Minor Components

Freeboard and similar soils
Percentage of component in the map unit: About 10 percent
Slope: 15 to 45 percent

Landform:
Mountain flanks, lower third interfluves
Backslopes on mountains
Vegetative classification:
GR, Herbaceous Communities-Valley and Foothill Grassland
CSS, Scrub Communities-Coastal Sage Scrub

Purser and similar soils
Percentage of component in the map unit: About 10 percent
Slope: 15 to 45 percent
Landform:
Interfluves on mountain flanks
Backslopes on mountains
Vegetative classification:
GR, Herbaceous Communities-Valley and Foothill Grassland
CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 5 percent
Landform:
Drainageways
Side slopes on mountains
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

185—Purser-Rock outcrop complex, 45 to 75 percent slopes, coastal cliffs

Map unit setting

General location: Two Harbors, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 0 to 970 feet (0 to 296 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Purser soil, coastal cliffs—65 percent
Rock outcrop, coastal cliffs—20 percent
Minor components—15 percent

Characteristics of Purser, coastal cliffs, and similar soils

Slope: 45 to 75 percent
Landform:
Coastal cliffs on hills
Free faces
Backslopes on hills
Parent material: Material weathered from volcanic rock and/or andesite
Typical vegetation: Coastal Sage Scrub and Grassland
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 0 to 40 percent by coarse gravel and 0 to 15 percent by cobbles
Depth to a restrictive feature: Lithic bedrock—8 to 20 inches
Slowest permeability class: Slow

Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 1.7 inches (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 8
Vegetative classification:
CSS, Scrub Communities-Coastal Sage Scrub
MCS, Scrub Communities-Maritime Cactus Scrub

Typical profile
A—0 to 4 inches; loam
Bt1—4 to 10 inches; clay loam
Bt2—10 to 14 inches; clay
R—14 to 24 inches; bedrock

Characteristics of Rock outcrop, coastal cliffs

Landform:
Free faces on coastal cliffs on hills
Side slopes of coastal cliffs on hills
Kind of material: Volcanic rock and/or andesite
Typical vegetation: None assigned

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Minor Components

Freeboard and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 45 to 75 percent
Landform:
Side slopes of hills
Vegetative classification:
CSS, Scrub Communities-Coastal Sage Scrub
GR, Herbaceous Communities-Valley and Foothill Grassland
MCS, Scrub Communities-Maritime Cactus Scrub

Luff and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 45 to 75 percent
Landform:
Side slopes of hills
Vegetative classification:
GR, Herbaceous Communities-Valley and Foothill Grassland
CSS, Scrub Communities-Coastal Sage Scrub
MCS, Scrub Communities-Maritime Cactus Scrub

Starbright and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 45 to 75 percent
Landform:
Side slopes of hills
Vegetative classification: IW, Woodland Communities-Island Woodland

190—Typic Xerofluvents-Riverwash complex, 0 to 8 percent slopes

Map unit setting

General location: Channel Islands National Park, Santa Cruz Island; Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: River valleys on islands
Elevation: 0 to 1,640 feet (1 to 500 meters)
Mean annual precipitation: 13 to 24 inches (330 to 610 millimeters)
Mean annual air temperature: 61 to 73 degrees F (16 to 23 degrees C)
Frost-free period: 320 to 365 days

Map unit composition

Typic Xerofluvents and similar soils—70 percent
Riverwash—15 percent
Minor components—15 percent

Characteristics of Typic Xerofluvents and similar soils

Slope: 0 to 8 percent
Landform:
Drainageways
Stream terraces
Parent material: Alluvium derived from metamorphic and sedimentary rocks
Typical vegetation: Mule fat, arroyo willow, and mixed grasses and forbs in riparian areas
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 0 percent
Depth to a restrictive feature: Abrupt textural change—22 to 26 inches
Slowest permeability class: Moderately rapid
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.6 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: Frequent
Present annual ponding: Occasional
Surface runoff class: Very low
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: A

Interpretive groups
Land capability classification (nonirrigated areas): 7w
Vegetative classification: Not assigned

Typical profile
Oi—0 to 2 inches; moderately decomposed plant material
A—2 to 24 inches; sandy loam
2C1—24 to 39 inches; extremely gravelly sand
3C2—39 to 72 inches; extremely cobbly sand

Characteristics of Riverwash

Landform:
Drainageways
Kind of material: Extremely stony alluvium derived from volcanic and sedimentary rocks
Typical vegetation: None assigned

Interpretive groups
Land capability classification (nonirrigated areas): 8
Vegetative classification: BSB, Riparian Communities-Bare Stream Beds

Minor Components

Cumulic Haploxerolls and similar soils
Percentage of component in the map unit: About 7 percent
Slope: 4 to 15 percent
Landform:
Flood plains
Stream terraces
Vegetative classification: Not assigned

Pachic Haploxerolls and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 2 to 8 percent
Landform:
Flood plains
Stream terraces
Vegetative classification: Not assigned

Rock outcrop
Percentage of component in the map unit: About 1 percent
Landform:
Flood plains
Stream terraces
Vegetative classification: Not assigned

Typic Fluvaquents and similar soils
Percentage of component in the map unit: About 1 percent
Slope: 0 to 2 percent
Landform:
Drainageways
Vegetative classification: Not assigned

191—Typic Haploxerepts-Typic Xerofluvents-Argixerolls complex, 0 to 8 percent slopes

Map unit setting

General location: Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Valleys on islands

Elevation: 0 to 865 feet (0 to 264 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Typic Haploxerepts and similar soils—40 percent
Typic Xerofluvents and similar soils—30 percent
Argixerolls and similar soils—20 percent
Minor components—10 percent

Characteristics of Typic Haploxerepts and similar soils

Slope: 2 to 8 percent
Landform:
Base slopes on flood plains
Inset fans
Parent material: Alluvium derived from volcanic and metamorphic rocks
Typical vegetation: Open Chaparral; California sagebrush and grasses covering large areas
pH in the surface layer: 6.1
Percentage of the surface covered by rock fragments: 25 to 35 percent by coarse gravel and 0 to 10 percent by cobbles
Depth to a restrictive feature: Strongly contrasting textural stratification—23 to 65 inches
Slowest permeability class: Moderate
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.5 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: Occasional
Present annual ponding: None
Surface runoff class: Very low
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: A

Interpretive groups
Land capability classification (nonirrigated areas): 7s
Vegetative classification:
MFS, Riparian Communities-Mule Fat Scrub
SRW, Riparian Communities-Southern Riparian Woodland
BSB, Riparian Communities-Bare Stream Beds

Typical profile
Oe—0 to 2 inches; moderately decomposed plant material
A—2 to 8 inches; very gravelly sand
C—8 to 31 inches; very gravelly sand
2Bw—31 to 65 inches; extremely gravelly loamy sand
3Ab1—65 to 75 inches; very gravelly loam
4Ab2—75 to 83 inches; very gravelly loam

Characteristics of Typic Xerofluvents and similar soils

Slope: 0 to 8 percent

Landform:
Base slopes in drainageways
Parent material: Alluvium derived from volcanic and metamorphic rocks
Typical vegetation: Mule fat, arroyo willow, and mixed grasses and forbs in riparian areas
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 25 to 35 percent by coarse gravel and 0 to 10 percent by cobbles
Restrictive feature: None noted
Slowest permeability class: Moderately rapid
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.3 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: Occasional
Present annual ponding: Occasional
Surface runoff class: Very low
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: A

Interpretive groups
Land capability classification (nonirrigated areas): 7w
Vegetative classification:
BSB, Riparian Communities-Bare Stream Beds
MFS, Riparian Communities-Mule Fat Scrub
SRW, Riparian Communities-Southern Riparian Woodland

Typical profile
Oe—0 to 1 inch; moderately decomposed plant material
A—1 to 9 inches; gravelly sand
2C1—9 to 26 inches; very gravelly sand
3C2—26 to 79 inches; very gravelly sand

Characteristics of Argixerolls and similar soils

Slope: 2 to 8 percent
Landform:
Base slopes on flood plains
Inset fans
Parent material: Alluvium derived from volcanic and metamorphic rocks
Typical vegetation: None assigned
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 0 to 5 percent by stones, 0 to 10 percent by cobbles, and 25 to 35 percent by coarse gravel
Restrictive feature: None noted
Slowest permeability class: Moderate
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 5.9 inches (moderate)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: Occasional
Present annual ponding: None
Surface runoff class: Very low
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: A

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification:
MFS, Riparian Communities-Mule Fat Scrub
SRW, Riparian Communities-Southern Riparian Woodland
BSB, Riparian Communities-Bare Stream Beds

Typical profile
A—0 to 4 inches; very gravelly sand
C1—4 to 16 inches; very gravelly sand
2C2—16 to 38 inches; very gravelly sandy clay loam
3Bt—38 to 79 inches; loam

Minor Components

Fluvaquents and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 0 to 2 percent
Landform:
Base slopes in drainageways
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Riverwash
Percentage of component in the map unit: About 5 percent
Landform:
Base slopes in drainageways
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

293—Rock outcrop, coastal cliffs-Nauti-Haploxerepts complex, 50 to 120 percent slopes

Map unit setting

General location: Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains on islands
Elevation: 0 to 1,600 feet (0 to 489 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Rock outcrop—65 percent
Nauti and similar soils—15 percent
Haploxerepts and similar soils—15 percent
Minor components—5 percent

Characteristics of Rock outcrop

Landform:
Mountain flanks on coastal cliffs
Kind of material: Quartz-diorite
Typical vegetation: None assigned

Interpretive groups
Land capability classification (nonirrigated areas): 8
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Characteristics of Nauti and similar soils

Slope: 55 to 100 percent
Landform:
Backslopes of mountain flanks on coastal cliffs
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.9
Percentage of the surface covered by rock fragments: 5 to 45 percent by coarse, subrounded gravel and 0 to 15 percent by subrounded cobbles
Depth to a restrictive feature: Paralithic bedrock—22 to 41 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.7 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 2 inches; loam
Bt1—2 to 7 inches; gravelly clay loam
Bt2—7 to 14 inches; gravelly clay
Bt3—14 to 31 inches; clay loam
Cr—31 to 41 inches; soft bedrock

Characteristics of Haploxerepts and similar soils

Slope: 55 to 100 percent
Landform:
Backslopes of mountain flanks on coastal cliffs
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: None assigned
pH in the surface layer: 6.8

Percentage of the surface covered by rock fragments: 5 to 45 percent by coarse, subrounded gravel and 0 to 15 percent by subrounded cobbles
Depth to a restrictive feature: Paralithic bedrock—12 to 20 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.0 inches (very low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Excessively drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 1 inch; gravelly sandy loam
A2—1 to 8 inches; sandy loam
Bw—8 to 16 inches; gravelly loam
Cr—16 to 79 inches; soft bedrock

Minor Components

Loadline and similar soils
Percentage of component in the map unit: About 5 percent
Landform:
Backslopes of mountain flanks on coastal cliffs
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

400—Oboship-Nauti-Bosun complex, 50 to 75 percent slopes

Map unit setting

General location: The eastern part of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains on islands
Elevation: 0 to 1,715 feet (0 to 523 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Oboship and similar soils—40 percent
Nauti and similar soils—25 percent
Bosun and similar soils—20 percent
Minor components—15 percent

Characteristics of Oboship and similar soils

Slope: 50 to 75 percent
Landform:
Backslopes of flanks on dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Island Chaparral, Island Woodland, Southern Riparian Woodland, and Coastal Sage Scrub
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 0 to 25 percent by coarse gravel and 0 to 5 percent by cobbles
Depth to a restrictive feature: Lithic bedrock—39 to 79 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 6.9 inches (moderate)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 9 inches; gravelly loam
Bt1—9 to 22 inches; gravelly loam
Bt2—22 to 33 inches; gravelly loam
Bt3—33 to 60 inches; extremely gravelly loam
R—60 to 70 inches; bedrock

Characteristics of Nauti and similar soils

Slope: 50 to 75 percent
Landform:
Backslopes of flanks on dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.9
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse, subangular gravel and 0 to 10 percent by subangular cobbles
Depth to a restrictive feature: Paralithic bedrock—22 to 41 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.7 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 2 inches; loam
Bt1—2 to 7 inches; gravelly clay loam
Bt2—7 to 14 inches; cobbly clay
Bt3—14 to 31 inches; clay loam
Cr—31 to 41 inches; soft bedrock

Characteristics of Bosun and similar soils

Slope: 50 to 75 percent
Landform:
Backslopes of flanks on dissected mountains
Toeslopes of flanks on dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Island Chaparral, Island Woodland, Southern Riparian Woodland, and Coastal Sage Scrub
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse gravel and 0 to 10 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—39 to 47 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.0 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
Oe—2 to 6 inches; moderately decomposed plant material
A—6 to 14 inches; gravelly sandy loam
Bt1—14 to 24 inches; gravelly loam
Bt2—24 to 31 inches; extremely gravelly sandy clay loam
Bt3—31 to 47 inches; extremely gravelly sandy clay loam

Cr—47 to 49 inches; soft bedrock

Minor Components

Rock outcrop
Percentage of component in the map unit: About 5 percent
Landform:
Drainageways
Side slopes of flanks on dissected mountains
Crests of flanks on dissected mountains
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Loadline and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 5 to 75 percent
Landform:
Backslopes on dissected mountains
Crests of ridges on interfluves
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Flyer and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 5 to 75 percent
Landform:
Backslopes of flanks on dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Marpol and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 5 to 75 percent
Landform:
Backslopes of flanks on dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

407—Nauti-Flyer-Marpol complex, 25 to 55 percent slopes

Map unit setting

General location: The eastern part of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 125 to 1,655 feet (39 to 505 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Nauti and similar soils—55 percent
Flyer and similar soils—15 percent
Marpol and similar soils—15 percent
Minor components—15 percent

Characteristics of Nauti and similar soils

Slope: 25 to 55 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills

Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.1
Percentage of the surface covered by rock fragments: 0 to 35 percent by coarse gravel and 0 to 5 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—24 to 43 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 5.2 inches (moderate)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 2 inches; loam
A2—2 to 8 inches; loam
Bt1—8 to 28 inches; silty clay loam
Bt2—28 to 34 inches; gravelly silty clay loam
Cr—34 to 43 inches; soft bedrock

Characteristics of Flyer and similar soils

Slope: 25 to 55 percent
Landform:
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 5.4
Percentage of the surface covered by rock fragments: 5 to 45 percent by coarse gravel and 0 to 10 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—20 to 59 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.5 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High

Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 4 inches; gravelly loamy sand
Bt1—4 to 13 inches; gravelly sandy loam
Bt2—13 to 28 inches; very gravelly loam
Bt3—28 to 35 inches; extremely gravelly sandy clay loam
Cr—35 to 39 inches; soft bedrock

Characteristics of Marpol and similar soils

Slope: 25 to 55 percent
Landform:
Backslopes of interfluves on hills
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, Non-Native Scrub, and Coastal Bluff Scrub
pH in the surface layer: 7.2
Percentage of the surface covered by rock fragments: 0 to 20 percent by coarse gravel and 0 to 5 percent by cobbles
Depth to a restrictive feature: Lithic bedrock—30 to 59 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 6.4 inches (moderate)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 1 inch; gravelly loam
Bt1—1 to 10 inches; clay loam
Bt2—10 to 28 inches; clay
Bt3—28 to 41 inches; clay
R—41 to 45 inches; bedrock

Minor Components

Bosun and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 10 to 60 percent

Landform:
Backslopes of interfluves on hills
Toeslopes of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Oboship and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 10 to 75 percent
Landform:
Toeslopes of interfluves on hills
Backslopes of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Haploxerolls and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 2 to 55 percent
Landform:
Toeslopes of drainageways
Vegetative classification: Not assigned

Loadline and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 10 to 75 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Luff and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 10 to 60 percent
Landform:
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Summits of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 1 percent
Landform:
Toeslopes of drainageways
Side slopes of hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

410—Express-Flyer-Loadline complex, 40 to 75 percent slopes

Map unit setting

General location: The eastern part of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains and hills on islands
Elevation: 640 to 1,715 feet (196 to 524 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Express and similar soils—35 percent
Flyer and similar soils—30 percent
Loadline and similar soils—20 percent
Minor components—15 percent

Characteristics of Express and similar soils

Slope: 40 to 75 percent
Landform:
  Backslopes of interfluves on dissected hills
  Shoulders of interfluves on dissected hills
  Flanks of dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.3
Percentage of the surface covered by rock fragments: 5 to 30 percent by coarse gravel and 0 to 10 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.9 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
  Present annual flooding: None
  Present annual ponding: None
  Surface runoff class: Medium
  Current water table: None noted
  Natural drainage class: Excessively drained
  Hydrologic soil group: B

Interpretive groups
  Land capability classification (nonirrigated areas): 7e
  Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
  A—0 to 8 inches; sandy loam
  Bw1—8 to 20 inches; loam
  Bw2—20 to 33 inches; loamy sand
  Cr—33 to 43 inches; soft bedrock

Characteristics of Flyer and similar soils

Slope: 40 to 75 percent
Landform:
  Backslopes of interfluves on dissected hills
  Shoulders of interfluves on dissected hills
  Flanks of dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.0

Percentage of the surface covered by rock fragments: 5 to 20 percent by coarse gravel and 0 to 5 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.5 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 9 inches; sandy loam
Bt1—9 to 16 inches; loam
Bt2—16 to 24 inches; loam
Cr—24 to 33 inches; soft bedrock

Characteristics of Loadline and similar soils

Slope: 40 to 75 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Flanks of dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.7
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse gravel and 5 to 10 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—16 to 30 inches
Slowest permeability class: Moderately rapid above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.1 inches (very low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Excessively drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 4 inches; loamy sand
Bt1—4 to 16 inches; sandy loam
Bt2—16 to 19 inches; gravelly sandy loam
Cr—19 to 29 inches; soft bedrock

Minor Components

Oboship and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 30 to 75 percent
Landform:
Toeslopes of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Haploxeralfs and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 30 to 50 percent
Landform:
Backslopes of interfluves on dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 3 percent
Landform:
Drainageways
Side slopes of dissected hills
Flanks of dissected mountains
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Xerofluvents
Percentage of component in the map unit: About 3 percent
Slope: 15 to 75 percent
Landform:
Drainageways
Toeslopes of dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

411—Flyer-Loadline-Nauti complex, 15 to 50 percent slopes

Map unit setting

General location: The eastern part of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 1,160 to 1,715 feet (355 to 523 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)

Frost-free period: 355 to 365 days

Map unit composition

Flyer and similar soils—45 percent
Loadline and similar soils—25 percent
Nauti and similar soils—15 percent
Minor components—15 percent

Characteristics of Flyer and similar soils

Slope: 15 to 50 percent
Landform:
  Shoulders of interfluves on dissected hills
  Backslopes of interfluves on dissected hills
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: None assigned
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 5 to 20 percent by coarse gravel and 0 to 5 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—20 to 30 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.5 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
  Present annual flooding: None
  Present annual ponding: None
  Surface runoff class: High
  Current water table: None noted
  Natural drainage class: Somewhat excessively drained
  Hydrologic soil group: B

Interpretive groups
  Land capability classification (nonirrigated areas): 7e
  Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
  A—0 to 9 inches; sandy loam
  Bt1—9 to 16 inches; loam
  Bt2—16 to 24 inches; loam
  Cr—24 to 31 inches; soft bedrock

Characteristics of Loadline and similar soils

Slope: 15 to 50 percent
Landform:
  Shoulders of interfluves on dissected hills
  Backslopes of interfluves on dissected hills
  Crests of interfluves on hills
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: None assigned
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 0 to 5 percent by cobbles and 5 to 20 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—12 to 30 inches

Slowest permeability class: Moderately rapid above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 1.7 inches (very low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Excessively drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 2 inches; sandy loam
Bt1—2 to 8 inches; fine sandy loam
Bt2—8 to 15 inches; sandy loam
Cr—15 to 18 inches; soft bedrock

Characteristics of Nauti and similar soils

Slope: 15 to 50 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.9
Percentage of the surface covered by rock fragments: 0 to 5 percent by cobbles and 5 to 20 percent by coarse gravel
Depth to a restrictive feature: Paralithic bedrock—22 to 41 inches
Slowest permeability class: Very slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 5.3 inches (moderate)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 4 inches; loam
Bt1—4 to 10 inches; silty clay
Bt2—10 to 31 inches; clay loam
CBt—31 to 35 inches; very gravelly sandy loam
Cr—35 to 45 inches; soft bedrock

Minor Components

Bosun and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 10 to 60 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Oboship and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 10 to 75 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 4 percent
Landform:
Drainageways
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Marpol and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 2 to 50 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

412—Flyer, gullied-Express, gullied-Bosun complex, 15 to 50 percent slopes

Map unit setting

General location: Eastern Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains and hills on islands
Elevation: 605 to 1,665 feet (185 to 509 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Flyer, gullied, and similar soils—30 percent

Express, gullied, and similar soils—25 percent
Bosun and similar soils—20 percent
Minor components—25 percent

Characteristics of Flyer, gullied, and similar soils

Slope: 15 to 50 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Flanks of dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: None assigned
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 25 to 35 percent by coarse, subrounded gravel; 0 to 10 percent by subrounded cobbles; and 0 to 5 percent by subrounded stones
Depth to a restrictive feature: Paralithic bedrock—20 to 30 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.5 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 4 inches; sandy loam
Bw—4 to 9 inches; loamy sand
Bt—9 to 24 inches; sandy loam
Cr—24 to 33 inches; soft bedrock

Characteristics of Express, gullied, and similar soils

Slope: 15 to 50 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Flanks of dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: None assigned
pH in the surface layer: 6.3
Percentage of the surface covered by rock fragments: 25 to 35 percent by coarse, subrounded gravel; 0 to 10 percent by subrounded cobbles; and 0 to 5 percent by subrounded stones

Depth to a restrictive feature: Paralithic bedrock—30 to 59 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.8 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 14 inches; sandy loam
Bw—14 to 30 inches; gravelly sandy loam
BC—30 to 41 inches; very gravelly loamy sand
Cr—41 to 43 inches; soft bedrock

Characteristics of Bosun and similar soils

Slope: 15 to 50 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Toeslopes of interfluves on dissected hills
Flanks of dissected mountains
Parent material: Slope alluvium over porphyry quartz-diorite and/or residuum
Typical vegetation: None assigned
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 0 to 5 percent by subrounded stones, 0 to 10 percent by subrounded cobbles, and 25 to 35 percent by coarse, subrounded gravel
Depth to a restrictive feature: Paralithic bedrock—30 to 59 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.2 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e

Vegetative classification:
IC, Scrub Communities-Island Chaparral
IW, Woodland Communities-Island Woodland
CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
Oe—2 to 3 inches; moderately decomposed plant material
A—3 to 12 inches; gravelly sandy loam
Bt1—12 to 22 inches; gravelly loam
Bt2—22 to 33 inches; very gravelly loam
Bt3—33 to 43 inches; extremely gravelly sandy loam
Cr—43 to 45 inches; soft bedrock

Minor Components

Express, ungullied, and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 15 to 50 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Flyer, ungullied, and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 15 to 50 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Nauti and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 15 to 50 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 4 percent
Landform:
Drainageways
Side slopes of dissected hills
Flanks of dissected mountains
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Loadline and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 15 to 50 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Summits of interfluves on dissected hills

Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Oboship and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 30 to 75 percent
Landform:
Backslopes of interfluves on dissected hills
Shoulders of interfluves on dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Marpol, gullied, and similar soils
Percentage of component in the map unit: About 1 percent
Slope: 20 to 50 percent
Landform:
Shoulders of interfluves on dissected hills
Backslopes of interfluves on dissected hills
Flanks of dissected mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

420—Masthead-Luff complex, 5 to 15 percent slopes

Map unit setting

General location: The central and western parts of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 180 to 1,095 feet (55 to 334 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Masthead and similar soils—45 percent
Luff and similar soils—40 percent
Minor components—15 percent

Characteristics of Masthead and similar soils

Slope: 5 to 15 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Parent material: Residuum weathered from metasedimentary rock
Typical vegetation: None assigned
pH in the surface layer: 6.5
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse gravel and 0 to 15 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.9 inches (low)
Shrink-swell potential: High (LEP of 6 to 9)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 1 inch; silt loam
A2—1 to 6 inches; silt loam
2Bt1—6 to 12 inches; silty clay loam
2Bt2—12 to 28 inches; silty clay
2Cr—28 to 33 inches; soft bedrock

Characteristics of Luff and similar soils

Slope: 5 to 15 percent
Landform:
Shoulders of interfluves on hills
Summits of interfluves on hills
Parent material: Eolian deposits over residuum weathered from volcanic and metamorphic rocks
Typical vegetation: None assigned
pH in the surface layer: 6.8
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse gravel and 0 to 15 percent by cobbles
Depth to restrictive features: Abrupt textural change—7 to 9 inches; paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 0.9 inch (very low)
Shrink-swell potential: High (LEP of 6 to 9)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: High
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: GR, Herbaceous Communities-Valley and Foothill Grassland

Typical profile
A—0 to 2 inches; silt loam
2Bt—2 to 7 inches; silt loam
2Btss—7 to 22 inches; clay
2Cr—22 to 32 inches; soft bedrock

Minor Components

Aridic Haploxererts and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 5 to 15 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Coastwise and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 5 to 15 percent
Landform:
Shoulders of interfluves on hills
Summits of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Dewpoint and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 5 to 15 percent
Landform:
Backslopes of interfluves on hills
Vegetative classification: Not assigned

Petrocalcic Palexeralfs and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 5 to 15 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

421—Masthead-Luff complex, 8 to 30 percent slopes

Map unit setting

General location: The central and western parts of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 0 to 425 feet (0 to 130 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Masthead and similar soils—45 percent
Luff and similar soils—40 percent
Minor components—15 percent

Characteristics of Masthead and similar soils

Slope: 8 to 30 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Parent material: Residuum weathered from metasedimentary rock

Typical vegetation: None assigned
pH in the surface layer: 6.5
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse gravel and 0 to 15 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.9 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 1 inch; silt loam
A2—1 to 6 inches; silt loam
2Bt1—6 to 12 inches; silty clay loam
2Bt2—12 to 28 inches; silty clay
2Cr—28 to 33 inches; soft bedrock

Characteristics of Luff and similar soils

Slope: 2 to 30 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Parent material: Eolian deposits over residuum weathered from volcanic and metamorphic rocks
Typical vegetation: None assigned
pH in the surface layer: 5.5
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse gravel and 0 to 15 percent by cobbles
Depth to restrictive features: Abrupt textural change—2 to 6 inches; paralithic bedrock—20 to 59 inches
Slowest permeability class: Very slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 0.3 inch (very low)
Shrink-swell potential: High (LEP of 6 to 9)
Potential for soil slippage: High

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Medium
Current water table: None noted

Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 3 inches; silt loam
2Bt1—3 to 9 inches; clay loam
2Bt2—9 to 24 inches; clay
2Bt3—24 to 47 inches; clay
2Cr—47 to 51 inches; soft bedrock

Minor Components

Dewpoint and similar soils
Percentage of component in the map unit: About 8 percent
Slope: 8 to 30 percent
Landform:
Backslopes of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Coastwise and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 8 to 30 percent
Landform:
Summits of interfluves on hills
Shoulders of interfluves on hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Fluvents and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 8 to 30 percent
Landform:
Toeslopes of interfluves in drainageways
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

422—Dewpoint-Masthead-Coastwise complex, 20 to 55 percent slopes

Map unit setting

General location: The central and western parts of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains and hills on islands
Elevation: 0 to 1,755 feet (0 to 536 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Dewpoint and similar soils—40 percent
Masthead and similar soils—25 percent
Coastwise and similar soils—15 percent
Minor components—20 percent

Characteristics of Dewpoint and similar soils

Slope: 20 to 55 percent
Landform:
Toeslopes of interfluves on the north aspects of hills
Backslopes of interfluves on the north aspects of hills
Shoulders of interfluves on the north aspects of hills
Flanks of the north aspects of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Island Chaparral, Island Woodland, Southern Riparian Woodland, and Oak Woodland
pH in the surface layer: 5.5
Percentage of the surface covered by rock fragments: 5 to 35 percent by channers and 0 to 15 percent by flagstones
Depth to a restrictive feature: Lithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 5.5 inches (moderate)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Medium
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 6 inches; gravelly silt loam
A2—6 to 11 inches; very gravelly silt loam
2Bt1—11 to 18 inches; very gravelly clay
2Bt2—18 to 33 inches; gravelly clay
2R—33 to 43 inches; bedrock

Characteristics of Masthead and similar soils

Slope: 20 to 55 percent
Landform:
Toeslopes of interfluves on hills
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.5

Percentage of the surface covered by rock fragments: 5 to 45 percent by channers and 0 to 15 percent by flagstones
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.0 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 2 inches; loam
2Bt—2 to 24 inches; gravelly clay
2Cr—24 to 33 inches; soft bedrock

Characteristics of Coastwise and similar soils

Slope: 20 to 55 percent
Landform:
Toeslopes of interfluves on hills
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 7.2
Percentage of the surface covered by rock fragments: 5 to 45 percent by channers and 0 to 15 percent by flagstones
Depth to a restrictive feature: Lithic bedrock—10 to 20 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 3.2 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 1 inch; loam
A2—1 to 4 inches; silt loam
2Bt1—4 to 10 inches; clay loam
2Bt2—10 to 19 inches; clay
2R—19 inches; bedrock

Minor Components

Coastwise, nongravelly, and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 15 to 60 percent
Landform:
Toeslopes of interfluves on hills
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Fluvents and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 8 to 30 percent
Landform:
Drainageways
Interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Masthead, nongravelly, and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 15 to 60 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Toeslopes of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Aridic Haploxererts and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 2 to 35 percent
Landform:
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 2 percent
Landform:
Drainageways
Hills
Flanks of mountains
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

423—Masthead-Coastwise-Dewpoint complex, 20 to 55 percent slopes

Map unit setting

General location: The central and western parts of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains and hills on islands
Elevation: 0 to 1,645 feet (0 to 502 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Masthead and similar soils—40 percent
Coastwise and similar soils—25 percent
Dewpoint and similar soils—20 percent
Minor components—15 percent

Characteristics of Masthead and similar soils

Slope: 20 to 55 percent
Landform:
Summits of interfluves on hills
Toeslopes of interfluves on hills
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 7.7
Percentage of the surface covered by rock fragments: 5 to 55 percent by channers and 0 to 15 percent by flagstones
Depth to restrictive features: Abrupt textural change—2 to 6 inches; paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 0.0 inches (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 4 inches; gravelly silt loam
2Bt1—4 to 11 inches; clay
2Bt2—11 to 30 inches; gravelly clay
2Cr—30 to 31 inches; soft bedrock

Characteristics of Coastwise and similar soils

Slope: 20 to 55 percent
Landform:
Shoulders of interfluves on hills
Toeslopes of interfluves on hills
Backslopes of interfluves on hills
Summits of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 5.5
Percentage of the surface covered by rock fragments: 5 to 55 percent by channers and 0 to 15 percent by flagstones
Depth to a restrictive feature: Paralithic bedrock—10 to 20 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.3 inches (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; very cobbly slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam
2Bt1—6 to 15 inches; sandy clay
2Bt2—15 to 18 inches; clay
2Cr—18 to 20 inches; soft bedrock

Characteristics of Dewpoint and similar soils

Slope: 20 to 55 percent
Landform:
Toeslopes of interfluves on the north aspects of hills
Shoulders of interfluves on the north aspects of hills
Backslopes of interfluves on the north aspects of hills
Flanks of the north aspects of mountains

Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Island Chaparral, Island Woodland, Southern Riparian Woodland, and Oak Woodland
pH in the surface layer: 6.0
Percentage of the surface covered by rock fragments: 5 to 35 percent by channers and 0 to 15 percent by flagstones
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.3 inches (low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Medium
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
Oe—1 to 4 inches; moderately decomposed plant material
A1—4 to 7 inches; loam
A2—7 to 13 inches; gravelly silt loam
2Bt1—13 to 26 inches; clay
2Bt2—26 to 30 inches; very gravelly clay
2Cr—30 to 39 inches; soft bedrock

Minor Components

Fluvents and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 2 to 30 percent
Landform:
Drainageways
Hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Luff and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 2 to 30 percent
Landform:
Shoulders of interfluves on hills
Toeslopes of interfluves on hills
Backslopes of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Aridic Haploxererts and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 2 to 30 percent
Landform:
Backslopes of interfluves on hills
Summits of interfluves on hills
Shoulders of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Rock outcrop
Percentage of component in the map unit: About 2 percent
Landform:
Drainageways
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Petrocalcic Palexeralfs and similar soils
Percentage of component in the map unit: About 1 percent
Slope: 2 to 30 percent
Landform:
Shoulders of interfluves on hills
Summits of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

424—Masthead-Dewpoint-Rock outcrop complex, 40 to 75 percent slopes

Map unit setting

General location: The central and western parts of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains and hills on islands
Elevation: 0 to 1,430 feet (0 to 436 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Masthead and similar soils—45 percent
Dewpoint and similar soils—30 percent
Rock outcrop—15 percent
Minor components—10 percent

Characteristics of Masthead and similar soils

Slope: 40 to 75 percent
Landform:
Summits of interfluves on hills
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub

pH in the surface layer: 7.7
Percentage of the surface covered by rock fragments: 5 to 35 percent by channers and 0 to 15 percent by flagstones
Restrictive feature: None noted
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 8.5 inches (high)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: C

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 10 inches; silt loam
2Bt1—10 to 26 inches; gravelly silty clay loam
2Bt2—26 to 53 inches; very gravelly silty clay
2Bt3—53 to 79 inches; clay

Characteristics of Dewpoint and similar soils

Slope: 40 to 75 percent
Landform:
Toeslopes of interfluves on the north aspects of hills
Shoulders of interfluves on the north aspects of hills
Backslopes of interfluves on the north aspects of hills
Flanks of the north aspects of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Island Chaparral, Island Woodland, Southern Riparian Woodland, and Oak Woodland
pH in the surface layer: 5.8
Percentage of the surface covered by rock fragments: 5 to 35 percent by channers and 0 to 15 percent by flagstones
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 5.5 inches (moderate)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted

Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
Oe—2 to 4 inches; moderately decomposed plant material
A1—4 to 9 inches; silt loam
A2—9 to 13 inches; silt loam
2Bt1—13 to 26 inches; gravelly clay
2Bt2—26 to 35 inches; gravelly silty clay loam
2Cr—35 to 45 inches; soft bedrock

Characteristics of Rock outcrop

Landform:
Drainageways
Hills
Flanks of mountains
Kind of material: Volcanic rock and/or andesite
Typical vegetation: None assigned

Interpretive groups
Land capability classification (nonirrigated areas): 8
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Minor Components

Fluvents and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 8 to 50 percent
Landform:
Drainageways
Hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Coastwise and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 25 to 75 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Summits of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

425—Coastwise-Masthead complex, 40 to 75 percent slopes, cobbly

Map unit setting

General location: The central and western parts of Santa Catalina Island
MLRA: 20—Southern California Mountains

Landscape: Hills on islands
Elevation: 130 to 1,245 feet (41 to 380 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Coastwise, cobbly, and similar soils—60 percent
Masthead, cobbly, and similar soils—25 percent
Minor components—15 percent

Characteristics of Coastwise, cobbly, and similar soils

Slope: 40 to 75 percent
Landform:
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Parent material: Residuum weathered from metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 7.7
Percentage of the surface covered by rock fragments: 5 to 55 percent by channers, 0 to 35 percent by flagstones, and 1 to 5 percent by stones
Depth to restrictive features: Abrupt textural change—2 to 6 inches; paralithic bedrock—10 to 20 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 0.8 inch (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 5 inches; cobbly silt loam
2Bt—5 to 17 inches; clay
2Cr—17 to 20 inches; soft bedrock

Characteristics of Masthead, cobbly, and similar soils

Slope: 40 to 75 percent
Landform:
Backslopes of interfluves on hills
Toeslopes of interfluves on hills
Shoulders of interfluves on hills
Parent material: Residuum weathered from metasedimentary rock

Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 7.7
Percentage of the surface covered by rock fragments: 5 to 55 percent by channers, 0 to 15 percent by flagstones, and 0 to 10 percent by stones
Depth to a restrictive feature: Abrupt textural change—5 to 8 inches; paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 0.1 inch (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 1 inch; gravelly silt loam
A2—1 to 6 inches; silt loam
2Bt1—6 to 16 inches; clay
2Bt2—16 to 30 inches; very gravelly clay
2Cr—30 to 35 inches; soft bedrock

Minor Components

Rock outcrop
Percentage of component in the map unit: About 10 percent
Landform:
Drainageways
Interfluves on hills
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Luff and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 15 to 60 percent
Landform:
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Toeslopes of interfluves on hills
Vegetative classification: Not assigned

Fluvents
Percentage of component in the map unit: About 1 percent
Slope: 5 to 35 percent
Landform:
Drainageways
Toeslopes of interfluves on hills
Vegetative classification: Not assigned

427—Masthead-Coastwise-Typic Haploxeralfs complex, 45 to 75 percent slopes

Map unit setting

General location: The central and western parts of Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Mountains on islands
Elevation: 0 to 1,775 feet (0 to 542 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Masthead and similar soils—40 percent
Coastwise, cobbly, and similar soils—25 percent
Typic Haploxeralfs and similar soils—20 percent
Minor components—15 percent

Characteristics of Masthead and similar soils

Slope: 45 to 75 percent
Landform:
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Summits of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 7.7
Percentage of the surface covered by rock fragments: 5 to 55 percent by channers and 0 to 15 percent by flagstones
Depth to restrictive features: Abrupt textural change—4 to 8 inches; paralithic bedrock—20 to 39 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 0.1 inch (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A1—0 to 1 inch; gravelly silt loam

A2—1 to 6 inches; gravelly silt loam
2Bt1—6 to 24 inches; clay
2Bt2—24 to 31 inches; extremely gravelly clay
2Cr—31 to 33 inches; soft bedrock

Characteristics of Coastwise, cobbly, and similar soils

Slope: 45 to 75 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Summits of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 7.2
Percentage of the surface covered by rock fragments: 5 to 55 percent by channers, 0 to 15 percent by flagstones, and 0 to 10 percent by stones
Depth to a restrictive feature: Lithic bedrock—10 to 20 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.0 inches (very low)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 6 inches; very gravelly sandy loam
2Bt—6 to 15 inches; gravelly clay loam
2R—15 to 16 inches; bedrock

Characteristics of Typic Haploxeralfs and similar soils

Slope: 45 to 75 percent
Landform:
Backslopes of interfluves on hills
Shoulders of interfluves on hills
Toeslopes of interfluves on hills
Flanks of mountains
Parent material: Material weathered from Catalina schist and/or metasedimentary rock
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Grassland, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.0

Percentage of the surface covered by rock fragments: 10 to 30 percent by channers and 0 to 10 percent by flagstones
Depth to a restrictive feature: Paralithic bedrock—20 to 39 inches
Slowest permeability class: Moderate above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 2.3 inches (very low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Somewhat excessively drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 2 inches; sandy loam
A2—2 to 7 inches; gravelly sandy loam
Bw—7 to 15 inches; gravelly loam
Bt—15 to 23 inches; very gravelly loam
Cr—23 to 39 inches; soft bedrock

Minor Components

Rock outcrop
Percentage of component in the map unit: About 10 percent
Landform:
Drainageways
Backslopes of mountain flanks
Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Coastwise and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 30 to 85 percent
Landform:
Toeslopes of interfluves on hills
Shoulders of interfluves on hills
Backslopes of interfluves on hills
Flanks of mountains
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

450—Urban land-Xerorthents, landscaped, association, 0 to 8 percent slopes

Map unit setting

General location: Avalon Canyon, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Valleys on islands

Elevation: 0 to 300 feet (0 to 92 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Urban land—70 percent
Xerorthents, landscaped, and similar soils—30 percent

Characteristics of Urban land

Slope: 0 to 8 percent
Landform:
  Alluvial flats
Kind of material: Human-transported material over alluvium derived from quartz-diorite; in areas of streets, sidewalks, buildings, and other structures
Typical vegetation: None assigned

Interpretive groups
  Land capability classification (nonirrigated areas): Not assigned
  Vegetative classification: D, Non-Vegetated Areas-Developed

Characteristics of Xerorthents, landscaped, and similar soils

Slope: 0 to 8 percent
Landform:
  Alluvial flats
  Areas of fill
Parent material: Alluvium derived from quartz-diorite
Typical vegetation: None assigned
pH in the surface layer: 6.5
Percentage of the surface covered by rock fragments: 0 percent
Restrictive feature: None noted
Slowest permeability class: Moderately slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 9.7 inches (high)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
  Present annual flooding: Rare
  Present annual ponding: Rare
  Surface runoff class: Low
  Current water table: None noted
  Natural drainage class: Excessively drained
  Hydrologic soil group: B

Interpretive groups
  Land capability classification (nonirrigated areas): 3e
  Vegetative classification:
    B, Non-Vegetated Areas-Bare Ground
    NNH, Herbaceous Communities-Non-Native Herbaceous

Typical profile
  A—0 to 2 inches; sandy loam
  C1—2 to 12 inches; loam

C2—12 to 59 inches; clay loam
C3—59 to 79 inches; loamy sand

451—Nauti, landscaped-Urban land complex, 8 to 30 percent slopes

Map unit setting

General location: Avalon Canyon, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 0 to 400 feet (0 to 122 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Nauti, landscaped, and similar soils—55 percent
Urban land—30 percent
Minor components—15 percent

Characteristics of Nauti, landscaped, and similar soils

Slope: 8 to 30 percent
Landform:
Hills
Parent material: Material weathered from quartz-diorite porphyry
Typical vegetation: Coastal Sage Scrub, Maritime Cactus Scrub, Island Chaparral, and Coastal Bluff Scrub
pH in the surface layer: 6.9
Percentage of the surface covered by rock fragments: 5 to 35 percent by coarse gravel and 0 to 10 percent by cobbles
Depth to a restrictive feature: Paralithic bedrock—22 to 41 inches
Slowest permeability class: Slow above the bedrock
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 4.2 inches (low)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: D

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
Ap—0 to 7 inches; loam
Bt1—7 to 16 inches; gravelly clay loam
Bt2—16 to 24 inches; cobbly clay

Bt3—24 to 30 inches; gravelly clay loam
Cr—30 to 39 inches; soft bedrock

Characteristics of Urban land

Slope: 8 to 30 percent
Landform:
Hills
Kind of material: Human-transported material over quartz-diorite; in areas of streets, sidewalks, buildings, and other structures
Typical vegetation: None assigned

Interpretive groups
Land capability classification (nonirrigated areas): Not assigned
Vegetative classification: D, Non-Vegetated Areas-Developed

Minor Components

Nauti and similar soils
Percentage of component in the map unit: About 7 percent
Slope: 0 to 55 percent
Landform:
Hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Flyer and similar soils
Percentage of component in the map unit: About 4 percent
Slope: 0 to 55 percent
Landform:
Hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Bosun and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 2 to 8 percent
Landform:
Hills
Vegetative classification: Not assigned

Rock outcrop
Percentage of component in the map unit: About 1 percent
Landform:
Hills
Vegetative classification: Not assigned

453—Typic Argixerolls-Urban land, landscaped, complex, 2 to 8 percent slopes

Map unit setting

General location: Two Harbors, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Hills on islands
Elevation: 0 to 725 feet (0 to 221 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Typic Argixerolls and similar soils—70 percent
Urban land, landscaped—15 percent
Minor components—15 percent

Characteristics of Typic Argixerolls and similar soils

Slope: 2 to 8 percent
Landform:
  Toeslopes of hills
  Footslopes of hills
Parent material: Alluvium derived from metasedimentary rock and/or colluvium derived from metasedimentary rock
Typical vegetation: None assigned
pH in the surface layer: 6.2
Percentage of the surface covered by rock fragments: 0 to 5 percent by coarse gravel
Restrictive feature: None noted
Slowest permeability class: Slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 9.3 inches (high)
Shrink-swell potential: Moderate (LEP of 3 to less than 6)
Potential for soil slippage: Medium

Selected hydrologic properties
  Present annual flooding: None
  Present annual ponding: None
  Surface runoff class: High
  Current water table: None noted
  Natural drainage class: Well drained
  Hydrologic soil group: C

Interpretive groups
  Land capability classification (nonirrigated areas): 7e
  Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
  A—0 to 2 inches; silt loam
  Bt1—2 to 11 inches; silt loam
  Bt2—11 to 26 inches; clay
  2C—26 to 59 inches; clay

Characteristics of Urban land, landscaped

Slope: 2 to 8 percent
Landform:
  Toeslopes of hills
  Footslopes of hills
Kind of material: Human-transported material (cut and fill) over schist and/or quartz-diorite; in areas of streets, sidewalks, buildings, and other structures
Typical vegetation: None assigned

Interpretive groups
  Land capability classification (nonirrigated areas): Not assigned
  Vegetative classification:
    D, Non-Vegetated Areas-Developed
    NNH, Herbaceous Communities-Non-Native Herbaceous
    B, Non-Vegetated Areas-Bare Ground

Minor Components

Luff and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 2 to 8 percent
Landform:
Toeslopes of hills
Footslopes of hills
Vegetative classification: Not assigned

Masthead and similar soils
Percentage of component in the map unit: About 6 percent
Slope: 2 to 8 percent
Landform:
Toeslopes of hills
Footslopes of hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Purser and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 2 to 8 percent
Landform:
Toeslopes of hills
Footslopes of hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

454—Typic Argixerolls-Calcic Haploxerolls-Urban land complex, 2 to 8 percent slopes, landscaped

Map unit setting

General location: Avalon Canyon, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Valleys on islands
Elevation: 25 to 290 feet (8 to 89 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Typic Argixerolls, landscaped, and similar soils—50 percent
Calcic Haploxerolls, landscaped, and similar soils—25 percent
Urban land, landscaped—15 percent
Minor components—10 percent

Characteristics of Typic Argixerolls, landscaped, and similar soils

Slope: 2 to 8 percent
Landform:
Alluvial flats
Parent material: Human-transported material over alluvium derived from quartz-diorite
Typical vegetation: None assigned
pH in the surface layer: 5.5
Percentage of the surface covered by rock fragments: 0 to 5 percent by coarse gravel
Restrictive feature: None noted

Slowest permeability class: Moderately slow
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 7.8 inches (high)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: Rare
Present annual ponding: Rare
Surface runoff class: Low
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: None noted

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: Not assigned

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; gravelly loam
Bt—5 to 16 inches; clay loam
2A—16 to 37 inches; gravelly coarse sandy loam
2Bt—37 to 63 inches; gravelly sandy clay loam

Characteristics of Calcic Haploxerolls, landscaped, and similar soils

Slope: 2 to 8 percent
Landform:
Alluvial flats
Parent material: Human-transported material over alluvium derived from quartz-diorite
Typical vegetation: None assigned
pH in the surface layer: 5.5
Percentage of the surface covered by rock fragments: 0 percent
Restrictive feature: None noted
Slowest permeability class: Moderate
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 7.7 inches (high)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Low

Selected hydrologic properties
Present annual flooding: Rare
Present annual ponding: Rare
Surface runoff class: Very low
Current water table: None noted
Natural drainage class: Well drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: NNH, Herbaceous Communities-Non-Native Herbaceous

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 3 inches; loam
A2—3 to 10 inches; loam
A3—10 to 19 inches; loam
2Bk1—19 to 26 inches; gravelly sandy loam
3Bk2—26 to 47 inches; loam
4Bk3—47 to 79 inches; loamy sand

Characteristics of Urban land, landscaped

Slope: 2 to 8 percent
Landform:
Alluvial flats
Kind of material: Human-transported material over alluvium derived from quartz-diorite; in areas of streets, sidewalks, buildings, and other structures
Typical vegetation: None assigned

Interpretive groups
Land capability classification (nonirrigated areas): Not assigned
Vegetative classification: D, Non-Vegetated Areas-Developed

Minor Components

Nauti and similar soils
Percentage of component in the map unit: About 5 percent
Slope: 2 to 8 percent
Landform:
Alluvial flats
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Bosun and similar soils
Percentage of component in the map unit: About 3 percent
Slope: 2 to 8 percent
Landform:
Alluvial flats
Vegetative classification: Not assigned

Fluvents and similar soils
Percentage of component in the map unit: About 2 percent
Slope: 2 to 8 percent
Landform:
Drainageways
Vegetative classification: Not assigned

456—Typic Xerorthents, fill-Typic Xerorthents, steep fill, association, 0 to 70 percent slopes

Map unit setting

General location: Avalon Canyon, Santa Catalina Island
MLRA: 20—Southern California Mountains
Landscape: Islands
Elevation: 1,455 to 1,635 feet (445 to 499 meters)
Mean annual precipitation: 7 to 17 inches (178 to 432 millimeters)
Mean annual air temperature: 55 to 70 degrees F (13 to 21 degrees C)
Frost-free period: 355 to 365 days

Map unit composition

Typic Xerorthents, fill, and similar soils—60 percent
Typic Xerorthents, steep fill, and similar soils—25 percent
Minor components—15 percent

Characteristics of Typic Xerorthents, fill, and similar soils

Slope: 0 to 3 percent
Landform:
  Hills
  Leveled land
Parent material: Fill derived from schist
Typical vegetation: None assigned
pH in the surface layer: 7.0
Percentage of the surface covered by rock fragments: 0 to 35 percent by subrounded channers and 0 to 10 percent by subrounded flagstones
Restrictive feature: None noted
Slowest permeability class: Moderate
Salinity: Not saline
Sodicity: Not sodic
Available water capacity to a depth of 60 inches: About 6.6 inches (moderate)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
  Present annual flooding: None
  Present annual ponding: None
  Surface runoff class: Very low
  Current water table: None noted
  Natural drainage class: Excessively drained
  Hydrologic soil group: B

Interpretive groups
  Land capability classification (nonirrigated areas): 7e
  Vegetative classification: B, Non-Vegetated Areas-Bare Ground

Typical profile
  A—0 to 4 inches; gravelly silt loam
  C1—4 to 61 inches; very gravelly silt loam
  C2—61 to 79 inches; very gravelly loam

Characteristics of Typic Xerorthents, steep fill, and similar soils

Slope: 50 to 70 percent
Landform:
  Areas of steep fill on backslopes
Parent material: Steep fill derived from schist
Typical vegetation: Open Chaparral; California sagebrush and grasses covering large areas
pH in the surface layer: 7.0
Percentage of the surface covered by rock fragments: 0 to 40 percent by subrounded channers, 0 to 10 percent by subrounded flagstones, and 0 to 5 percent by subrounded stones
Restrictive feature: None noted
Slowest permeability class: Moderate
Salinity: Not saline
Sodicity: Not sodic

Available water capacity to a depth of 60 inches: About 8.9 inches (high)
Shrink-swell potential: Low (LEP of less than 3)
Potential for soil slippage: Medium

Selected hydrologic properties
Present annual flooding: None
Present annual ponding: None
Surface runoff class: Very high
Current water table: None noted
Natural drainage class: Excessively drained
Hydrologic soil group: B

Interpretive groups
Land capability classification (nonirrigated areas): 7e
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Typical profile
A—0 to 6 inches; gravelly silt loam
C—6 to 79 inches; very gravelly silt loam

Minor Components

Urban land
Percentage of component in the map unit: About 10 percent
Slope: 0 to 3 percent
Landform:
Treads on leveled land
Vegetative classification: D, Non-Vegetated Areas-Developed

Masthead and similar soils
Percentage of component in the map unit: About 3 percent
Landform:
None assigned
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

Coastwise and similar soils
Percentage of component in the map unit: About 2 percent
Landform:
Toeslopes of hills
Vegetative classification: CSS, Scrub Communities-Coastal Sage Scrub

DAM—Dam

MLRA: 20—Southern California Mountains
Landform: Floodways
Map unit composition:
Dam—100 percent

GP—Gravel pits

MLRA: 20—Southern California Mountains
Landform: Tread toeslopes in gravel pits
Kind of material: Sandy and gravelly alluvium
Map unit composition:
Gravel pits—100 percent

W—Water

MLRA: 20—Southern California Mountains
Map unit composition:
Water—100 percent

Use and Management of the Soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; or 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 gravel, sand, reclamation material, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

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

Interpretive Ratings

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

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate whether or not the soils are limited by soil features that affect a specified use or in terms that indicate the potential of the soils for the use. Thus, the tables may show limitation classes or classes indicating the potential of the soils for the use. Terms for the limitation classes are *no limitations* and *limitations*. Terms indicating potential are *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.

Land Capability Classification

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

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

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

Class 1 soils have slight limitations that restrict their use.

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

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

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

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

Class 6 soils have severe limitations that make them 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.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in all soil surveys.

The capability classification of the soils in this survey area is given in table 2 and in the section "Detailed Soil Map Units."

Major Land Resource Areas

The land capability classification system can be further refined by designating the major land resource area (MLRA) of the soils. A major land resource area is a broad geographic area that has a distinct combination of climate, topography, vegetation, land use, and general type of farming (USDA/NRCS, 2006).

Santa Catalina Island is in MLRA 20, Southern California Mountains. This MLRA makes up about 9,605 square miles (24,890 square kilometers). The towns of Santa Barbara, Fillmore, Ramona, and Banning, California, are in this MLRA. A major portion of MLRA 20 is made up of national forests, including the Los Padres, San Rafael, Angeles, Cleveland, and San Bernardino National Forests. The climate on the eight Channel Islands can differ somewhat from the climate on the mainland portions of this MLRA. More detailed information is available in the "Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin" (USDA/NRCS, 2006), which is available online at http://soils.usda.gov/survey/geography/mlra/.

Air Quality and Wind Erosion

Particulate matter is fine dust, soot, metals, smoke, dirt, and liquid droplets that become airborne. Typically, particulate matter with an aerodynamic diameter of 10 microns (0.000010 meter or 0.00039 inch) or less (PM-10) is of direct importance to certain human health and environmental issues, including damage to vegetation, corrosion of building material, and reduction in visibility (USEPA).

There are basically two sources of PM-10: natural and human-made sources. Natural sources include such things as sea salt and volcanic ash. Within the broad category of human-made sources there are three major subsets of sources: a) direct emissions, which originate from a variety of sources, including industrial facilities, diesel engines, and wood combustion; b) fugitive emissions, which include dust and dirt from construction activity, roadways, or agricultural and military activities; and c) secondary particulate matter, which is formed in the atmosphere by transformation of emitted gases, such as sulfur dioxide, nitrogen oxides, and volatile organic compounds.

PM-10 emissions are also called fugitive dust. The Federal standard for PM-10 is a maximum of 150 micrograms per cubic meter of air over any 24-hour period and a daily average of no more than 50 micrograms per cubic meter over a 1-year period. California State regulations are even more stringent, allowing 50 and 30 micrograms, respectively.

Sources of PM-10 on Catalina Island could be directly related and limited to original mainland eolian parent material sources. The geographic location of Catalina Island limits the number of days when the presence of PM-10 would be a severe air quality factor. The number of days with sufficient wind velocity (blowing in either direction) from an island source to initiate transportation of PM-10 is high, but the normal health concerns resulting from airborne PM-10 material from Catalina are limited. The relative air quality concerns originate from mainland PM-10 sources, and the particulates would be most abundant in the atmosphere during seasonal northeast Santa Ana winds. These particulate transfers from the mainland over the eastern Pacific Ocean are well documented (Muhs and others, 2007). Recent (the last 5,000 years) soil formation has been affected by eolian deposition of particles originating in the Mojave Desert of California (Muhs and others, 2008). These deposits subsequently become potential local PM-10 sources. Once these deposits of fine soil material are disturbed on Santa Catalina, they become highly erodible and have PM-10 potential.

Wind erosion contributes to PM-10. In their natural undisturbed state, most soils are resistant to wind erosion. Wind erosion occurs whenever bare, loose, dry soil is exposed to wind of sufficient speed to cause soil movement. The process is accelerated whenever the natural equilibrium between climate, soils, and vegetation is disturbed. During a dust storm, the bulk of eroding material from most soils moves only a foot or two above the soil surface, where it is subject to downwind transport (Washington State University, 1998). This larger mass, consisting mostly of coarse particles, can have significant economic impacts due to offsite transport. More importantly, however, is the selectivity of wind erosion in removing the finer soil particles from the eroding area. This sorting process can result in dust clouds ranging from a few feet to several miles high carrying tons of soil particulates hundreds to thousands of miles from the original source. This suspended material contributes the least to the total eroding mass but is the most damaging to air quality.

There are two basic processes involved in wind erosion: detachment and transport. Detachment is the initiation of soil movement. It occurs when the wind force or the impact of moving particles is strong enough to dislodge stationary soil particles (Washington State University, 1998). After detachment, the soil particles are subject to transport by wind through the air or along the soil surface, until they are eventually deposited when the wind velocity decreases.

The windspeed at which soil particles begin to move in the windstream is called the threshold velocity. Windspeeds near the soil surface tend to be moderated to a height of several feet above the surface by various obstructions at the surface as well as by topographic changes. Thus, the threshold velocity of a soil that has been roughened or covered with nonerodible materials, such as plants, stones, and clods, will be higher than that of the same soil having a bare, smooth, loose surface. This threshold velocity also depends on the inherent nature and properties of a given soil, or its inherent erodibility.

Erodibility varies considerably within and among soils as a result of variations in texture, content of organic matter, and aggregate structure (Washington State University, 1998). Generally, erodibility increases with increasing sand content of the soil and decreases with increasing clay content. Clay soils tend to form nonerodible aggregates more readily than sandy soils. Soils with loamy or finer textures (as opposed to sandy textures), however, have a greater propensity, when disturbed, to be significant contributors to a given PM-10 event due to their higher proportion of particles in the silt and clay size fractions.

Soil particles and aggregates less than 0.84 millimeter in size (840 um or 0.033 inch) obtained by dry sieving the surface inch of soil are generally considered erodible by wind, and their mass fraction has been used as an index of soil erodibility. This approach varies in its applicability from area to area because of differences in the makeup of the soil and corresponding differences in particle density. A more meaningful method for characterizing soil erodibility is by direct measurements with a portable wind tunnel on standardized field plots.

Windspeeds as low as 13 to 15 miles per hour 1 foot above the soil surface can initiate soil blowing under highly erodible conditions. It should be noted that the mere passage of vehicle tires or tracks over an erodible surface also provides sufficient energy to initiate soil blowing. As medium size particles are detached, they may enter the windstream momentarily but are then pulled back by gravity. As a result, they impact other particles and set them into motion. This process is called saltation, or, literally, a jumping behavior. Saltating particles are typically 100 to 500 um (um = 10^{-6} meter) in diameter and can account for 50 to 80 percent of the total soil movement.

As a result of saltation, direct wind forces, or vehicle surface disruption, particulates 100 um and less (less than 50 um is probably more common) in diameter are generated and suspended into the windstream and transported. Suspension accounts for 3 to 40 percent of the total soil particle load during wind erosion and is the type of movement that is of greatest concern to air quality. Unlike saltation, the volume of the suspended load, which disperses into the atmosphere, is more commonly limited by available particulates from the soil surface than by available wind energy.

Certain management practices can help to minimize wind erosion and, subsequently, the amount of fugitive dust produced and the frequency of occurrence. On unpaved roads and tracks, management practices include limiting vehicle traffic, chemically stabilizing or wetting road surfaces, and paving roads. Practices for areas other than roads include revegetation, limiting or prohibiting vehicle traffic, placing a gravel cover on the soil surface, and planting windbreaks. Shallow flooding, chemical stabilization, or a gravel cover can help to limit the contribution of dry lakebeds to degraded air quality.

Prime Farmland

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

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

None of the soils in this survey area meet the requirements for designation as prime farmland. The history of land use on Santa Catalina Island documents areas that were productive cropland, used primarily for the production of livestock feed. On some soils, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, can be used. Onsite evaluation is needed to determine whether or not the hazard or limitation can be overcome by corrective measures.

Farmland created by extensive human management, such as the vineyards at Escondido Ranch, are not considered prime farmland because of the extensive additions to the soil from non-native sources and the grading of the slopes. The soils of the old hayfields near Middle Ranch and a few of the alluvial deposits of map unit

191 could potentially be designated as prime farmland, especially if these areas were irrigated.

Hydric Soils

This section lists the map units in the survey area that may include hydric soils. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and Vasilas, 2006).

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 all 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, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (Soil Survey Staff, 1999) and “Keys to Soil Taxonomy” (Soil Survey Staff, 2006) and in the “Soil Survey Manual” (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time 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 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.

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

The following map units, in general, do not meet the definition of hydric soils because they do not have one of the hydric soil indicators. Some parts of these map units, however, may include hydric soils. Onsite investigation is recommended to determine whether hydric soils occur and the location of the hydric soils.

191—Typic Haploxerepts-Typic Xerofluvents-Argixerolls complex, 0 to 8 percent slopes
422—Dewpoint-Masthead-Coastwise complex, 20 to 55 percent slopes
423—Masthead-Coastwise-Dewpoint complex, 20 to 55 percent slopes
453—Typic Argixerolls-Urban land, landscaped, complex, 2 to 8 percent slopes

Rangeland

Loretta J. Metz, Marchel Munnecke, and Kendra Moseley, Rangeland Management Specialists, Natural Resources Conservation Service, helped prepare this section.

Typically, rangeland refers to “wildland” under a cover of 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. Other than the small vineyard at Escondido Ranch, there is no cropland on Catalina Island. Many of the oak stands could be considered forestland as they typically consist of trees more than 10 feet tall and have a canopy cover of more than 25 percent. More commonly, these areas are referred to as woodland. Catalina Island is dominated by rangeland; however, most plant communities include invasive and exotic plant species.

Characterization and Management of Rangeland on Santa Catalina Island

As is the case on most of the eight Channel Islands, the vegetation on Santa Catalina has been altered significantly in its plant composition within the last 200 years. Santa Catalina Island is home to several common plant communities. Despite the fact that the island has been inundated with exotic and non-native species, the Catalina Island Conservancy has undertaken the most comprehensive vegetation documentation and management efforts. Information about the conservancy’s programs is available at http://www.catalinaconservancy.org/ecology/plants/index.cfm.

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 characterizes and maps soil properties. These properties can be correlated to plant communities or ecological site descriptions. 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 (USDA, 2003). The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Soil types and plant communities are correlated to serve as the basis for the development of each ecological site description. Soil properties that affect the plant moisture and nutrient supply, 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 also are 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 Coastal Sage Scrub or chaparral-type species because of the intense heat and high evapotranspiration rate and the resultant droughtiness (fig. 8). Soils on northerly and easterly slopes are exposed to less solar radiation and generally

Figure 8.—This area of Oboship-Nauti-Bosun complex, 50 to 75 percent slopes, shows the typical vegetation of the Island Woodland and Island Chaparral plant communities (on the linear and convex upper slopes) and the Coastal Sage Scrub plant communities (on the dryer southern slopes).

support forestland, island woodland, and larger plant species and denser communities of large plants. Differences in the soil properties that affect plant community composition, production, and distribution are considered in correlating ecological sites to individual soil map unit components.

All of the plant names are correlated directly with the USDA PLANTS Database (http://plants.usda.gov).

Common Plant Communities in the Survey Area

Plant species are well documented on Santa Catalina. In 1985, 606 species were identified in a compilation by Gary Wallace. Of this total, 421 species are indigenous and 185 have been introduced. The island supports seven endemic plants—four fully endemic and three subspecies. Additionally, Santa Catalina is part of the Channel Island archipelago, which sustains approximately 30 species, subspecies, and varieties found solely on these islands (Schoenherr and others, 1999).

A brief description of the common plant communities in the survey area is given in the following paragraphs. There are six major habitat types on the island (Knapp, 2002; Schoenherr and others, 1999): Coastal Sage Scrub, Grasslands, Island Chaparral, Riparian Woodland, Coastal Bluff Scrub, and Island Woodland.

Coastal Sage Scrub is the most prevalent plant community on the island (fig. 9). It can be subdivided into north- and south-aspect communities. California sage (*Artemisia californica*), coast brittlebrush, black sage, goldenbush, coyotebrush, monkeyflower, and pricklypear cactus (*Opuntia littoralis*) are a few of the dominant plants on southern slopes. Some annual and perennial grasses also occupy these areas. Coastal Sage Scrub on northern slopes has many of the same species, but the plants are generally larger and include a higher percentage of toyon, laurel sumac, and lemonade (berry) sumac (*Rhus integrifolia*).

Grasslands (fig. 10) are dominated by exotic annual grasses and forbs, such as wild oats (*Avena fatua*), ripgut brome, California brome, red brome, Italian ryegrass, meadow barley, foxtail, and stork's bill (*Erodium* spp.), mixed with native bunch grasses (*Nassella* spp.).

Island Chaparral is generally represented on the northern and eastern slopes by evergreen and drought-resistant shrubs and low trees, such as island scrub oak (*Quercus pacifica*), chamise (*Adenostoma fasciculatum*), island ceanothus, big-pod ceanothus, island mountain mahogany, the endangered Catalina Island mountain mahogany, and the rare Catalina Island manzanita (*Arctostaphylos catalinae*).

Riparian Woodland plant communities are limited to a few perennial streams in relatively deep lateral canyons and marshy wetland areas adjacent to artificial water impoundments and one natural lake. Representative riparian plants are black cottonwood (*Populus trichocarpa*), red willow (*Salix* spp.), mule fat (*Baccharis pilularis*), and various sedges and rushes (Knapp, 2002; Sweitzer and others, 2005).

Coastal Bluff Scrub is restricted to rocky cliffs and is dominated by giant coreopsis, island dusty miller (*Eriophyllum nevinii*), Catalina crossosoma, and the Catalina Island live-forever (*Dudleya hassei*).

Island Woodland communities are similar to those of the Island Chaparral, but the individual plants are much larger. This characteristic is sometimes referred to gigantism. The communities occur on the lower parts of hills and canyons and on northern aspects. The most notable species are Catalina cherry, island oak, and

Figure 9.—A typical area of Tongva-Freeboard-Starbright complex, 30 to 55 percent slopes. The Tongva soil, on the steeper side slopes, supports vegetation of the Coastal Sage Scrub plant community. The Freeboard soil, on the shoulders and broad summits, supports grasses and some sage. The Starbright soil, on the concave slopes and in draws, supports oaks.

Figure 10.—In this area of Tongva-Pachic Argixerolls-Freeboard complex, 55 to 75 percent slopes, the Tongva soil is on steep side slopes covered with grasses. The history of grazing by ungulates is evident by the horizontal features across the slopes.

MacDonald oak. Valley oak is very limited, and live oaks do not occur at all. There are a few clusters of the Santa Catalina ironwood.

Bushy spikemoss (*Selaginella bigelovii*) occurs across most of the island. It can be found in areas of the Coastal Sage Scrub community. This small perennial fern is of significant importance to the quality of rangeland and to soil stability (fig. 11). Its many fibrous roots act to hold the more highly erodible soils in place on many hillsides.

Wildlife Habitat

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

The soils in the survey area provide habitat for various kinds of wildlife. The following paragraphs provide a brief history of wildlife and soil use on the island and describe some of the native and introduced animals that inhabit the survey area.

More than 37 land bird species have been identified on Santa Catalina Island. Two of these species represent endemic races: the California quail (*Callipepla californica catalinensis*) and a race of Bewick's wren (*Thryomanes bewickii catalinae*). Several species on Santa Catalina are endemic to the Channel Islands. These are the loggerhead shrike, western flycatcher, rufous-sided towhee, house finch, orange-crowned warbler, Allen's hummingbird, and horned lark.

Riparian areas along the perennial streams, typified by Typic Xerofluvents, are home to many native songbirds. These soils are crucial for providing adequate habitat for nests threatened by competition from the brown-headed cowbird, which is a non-native species introduced with the bison. These birds are nest parasites and may upset native nesting resources (Schoenherr and others, 1999).

Golden eagles established a temporary presence on the island during the decline of the bald eagle population in the 1970s. After an intensive captive breeding program, the bald eagle has been reestablished and is producing healthy nests without human aid. The precipitous coastal cliffs and large volcanic rock outcropping in the interior provide habitat for these iconic birds. Other raptors are the red-tailed hawk and the American kestrel. Several owl species, including the long-eared owl, the northern saw-whet owl, and the burrowing owl, are found on Catalina.

Burrowing owls commonly inhabit evacuated animal burrows, but they may or may not be directly linked to the presence of burrowing animals. Deer mice, harvest mice, and ground squirrels are common on the island. Deer mice usually burrow in a simple design that consists of two or three short branches converging from as many surface openings to a single tunnel that slopes steeply to the globular nest chamber, which is 7 to 10 centimeters in diameter. The nests are hollow balls of dry grass, shredded weed stems, and other available material (Davis and Schmidly, 1997). The Catalina ground squirrels live in complex burrows, on hillsides or in low earth banks where sites can be excavated horizontally, although many burrows are dug down vertically several feet to assure protection. The burrows, which are about 4 or 5 inches in diameter, can range in length from 5 feet to more than 35 feet and may be used by many generations of ground squirrels. Some burrows house single squirrel occupants, but others may be colonial homes for several squirrels. Short burrows

Figure 11.—An area of Masthead and Coastwise soils in which the silt surface mantle is held in place by bushy spikemoss. Adjacent degradation has left a cobbly, rough surface.

may have a single opening, but longer branched burrows commonly have two or more openings. In studying the California ground squirrels, one group of scientists found a squirrel home, housing six females and five males, that consisted of tunnels totaling 741 feet in length and having 33 openings. The deepest tunnel was 28 feet below ground. Although most tunnel excavation work is done in the spring, digging and burrow improvement are continuing processes (Jameson and Peeters, 2004). The Catalina Island ground squirrels have lived on the island for hundreds of years; remains have been discovered in native islanders' midden sites. Whether these animals arrived as a result of human transport or natural migration to the island, their habitat has allowed gigantism to occur; the Catalina Island ground squirrels are slightly larger than their mainland relatives (Schoenherr and others, 1999).

Habitat for these burrowing animals can be associated with some of the soils mapped in this survey. Although the deer mice and harvest mice can be found throughout the area, deer mice are more likely to be in areas of Dewpoint, Starbright, Oboship, and Bosun soils, which do not support the Coastal Sage Scrub. Harvest mice are most likely to be in areas of Nauti, Coastwise, Masthead, Purser, and Luff soils, which have a cobbly surface layer. The Catalina Island ground squirrel is most common in areas of Express, Flyer, Oboship, and Nauti soils (fig. 12), which can be relatively easily excavated.

Other animals on the island, such as the island fox, tended toward dwarfism, growing smaller over the ages. Six species of bats have been documented on the island. Santa Catalina is also one of the three Channel Islands inhabited by snakes and is the only one to have the Western rattlesnake. The island hosts five species of snakes, three species of lizards, salamanders, and the Pacific tree frog. The destruction of the sensitive surface soil by introduced ungulates can alter vegetation and reduce the extent of soils that are easily excavated. As a result, areas of habitat and areas used for protection by a variety of species can be affected, either on the side slopes of hills and mountains or in riparian areas.

The hills and mountains of map units 420, 422, 423, 425, and 427 have rocky surfaces and some rock outcrop occurring in most areas. These rocky areas provide good habitat for various species that commonly hide under rocks and also for the species that prey upon them. Examples of these soils are the Coastwise and Masthead series.

Ungulates and Soil Disturbance

The introduction of non-native mammals to the island has a well documented history of causing such problems as the loss of native plant communities (and of the native animals that they naturally support), introduced disease, and unabated predators. Several mammals have been introduced on Santa Catalina, and some of these still remain. The non-native mammals introduced to Santa Catalina are primarily feral goats and pigs, bison, house cats, deer, domestic rats and mice, dogs, horses, and cattle.

Goats were the first non-native ungulates to affect the island's vegetation in the early 1800s. Squatter shepherds would tend flocks from the private beaches and landings. By the 1860s, organized ranching operations included cattle and sheep (Sweitzer and others, 2005; Schoenherr and others, 1999).

Wild pigs were brought from the northern islands in 1934 in an attempt to control the rattlesnakes. The pigs do not target only snakes, however; they also eat other reptiles, bird eggs, seedlings, and roots and cause widespread ecological disruption. Mule deer were introduced in the 1930s, and bison were introduced beginning in 1924 (Sweitzer and others, 2005; Schoenherr and others, 1999). Although these

Figure 12.—An area of Express-Flyer-Loadline complex, 40 to 75 percent slopes, showing the effects of burrowing activity by the Catalina ground squirrel.

animals can survive on the island's available water and vegetation, their eating habits and behaviors evolved with natural predators, of which none exist on Catalina Island. Their appetite for certain plants can alter the vegetative population of plant communities drastically and forever. These plants are normally associated with the existence of other, native wildlife, such as the island fox, and with soil and landform morphology.

Santa Catalina Island is continuing to evolve back toward its natural homeostasis of wildlife and vegetation. The recovery of soil lost as a result of the impact of wildlife management practices is rare and typically takes more than a human lifetime. The rate of soil loss and erosion has been drastically reduced as these introduced mammals have been removed, beginning with the sheep in the 1920s. Cattle operations ended in the 1960s. In the 1970s, an intensive culling program was used to reduce the number of feral pigs, goats, and bison. All of the goats and more than 12,000 pigs were finally removed after an intensive removal program was initiated in the late 1990s (Sweitzer and others, 2005).

Feral pigs became a major vector for the spread of weeds and a source of surface disturbance as a result of their digging for food. The effect on plant communities and on the soils has been significant. The pigs have been removed, but their mark is still very visible on the land. Evidence of their digging behavior can still be seen.

Feral pigs, goats, and sheep have affected large areas of the Channel Islands. In some areas the pigs have dug holes as much as 3 feet deep. The digging tends to destroy or highly disturb the plant community and can significantly disturb the natural soils. Crisscross sheep and goat trails still mark hillsides. Deer trails are still very evident, and fresh vertical trails are pronounced vectors for accelerated erosion. In some areas the changes are irreversible, and in others it will take hundreds of years before the soils resemble what they were in their natural state.

The detrimental impacts of pig disturbance on the soil include:

1) Destruction of soil structure and "tilth," reducing the ability of the soil to sustain plants and soil organisms, reducing the infiltration rate of the soil, and increasing the runoff rate and the hazard of erosion.

2) Destruction of the protective surface layer when it is churned and mixed into the subsoil. Loss of the topsoil reduces the fertility level of the soil, increases the hazard of erosion, and increases the soil temperature to abnormal levels, thus disrupting the natural soil ecology.

3) Where large areas are denuded of plants, a very high runoff potential and very high hazards of wind erosion and water erosion.

4) Reduction of the content of organic matter in the soil because of "aeration." The pigs aerate the soil, but this aeration is detrimental to the natural ecology of the soil and to soil structure and fertility. Exposing the soil to the open atmosphere after it has remained undisturbed for many thousands of years causes an irreversible oxidation process whereby the organic matter natural in the soil "burns off."

The Combined Effect of Fire and Ungulates

Many of the soils on Santa Catalina are sandy loams or formed in silty eolian deposits. These soils are naturally susceptible to erosion, especially when they occur on steep slopes and are underlain by clay, which can act as an impermeable layer, sending water downslope before it penetrates the soil surface. The hazard of erosion in areas of these soils is increased when the surface is exposed to disturbances that affect plant cover, root density, water penetration, and soil structure. The exposure of soils on Santa Catalina to fire and to uncommon wildlife exponentially alters the behavior and response of soils.

Santa Catalina Island is susceptible to both naturally occurring and manmade wildfires. The most important effect of fire on soil conditions is the loss of plant cover. This plant cover acts as a barrier that lessens the impact and force of raindrops. Raindrops can have a pronounced destructive effect on particle adhesion and on the resistance of the surface layer to erosion.

The hydrophobic soil properties that result from a fire are a form of natural defense. Although minimal, the water repulsion helps to keep the soils from becoming saturated and then susceptible to downhill movement. Conversely, the hydrophobic properties send water faster and in greater volume to the lowest collecting points. As a result, the hazard of erosion in drainageways is increased.

This protective reaction from fire is lost when minimal surface disturbance occurs. Unfortunately, disturbance of the surface layer in fire zones is encouraged by the natural propagation of native plants that are more palatable to deer and bison.

Recreation

The soils of the survey area are rated in tables 3a and 3b according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. A rating of *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 numerical ratings of less than 1.00 can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limitations* with numerical ratings of 1.00 generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 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 recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in these tables can be supplemented by other information in this survey, for example, interpretations for dwellings without basements, for local roads and streets, and for septic tank absorption fields.

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

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

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

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

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

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

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.”

Urban development on Santa Catalina Island is primarily limited to the City of Avalon, the area of Two Harbors, Middle Ranch, Whites Landing, and limited camps and resort areas on the northern coast. Although the island is dominantly protected open space and new urban development is unlikely, independent sites for structures and development to meet the needs of management and recreation may be sought.

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, reclamation material, roadfill, and topsoil; plan structures for water management; 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 4a and 4b 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 ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. A rating of *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 numerical ratings of less than 1.00 can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limitations* with numerical ratings of 1.00 generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 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

The degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill are shown in tables 5a and 5b. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. A rating of *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 numerical ratings of less than 1.00 can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limitations* with numerical ratings of 1.00 generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 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).

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 6a and 6b provide 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.

Gravel and *sand* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 6a, 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.

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

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

Tables 7a and 7b give 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; pond reservoir areas; and irrigation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. A rating of *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 numerical ratings of less than 1.00 can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limitations* with numerical ratings of 1.00 generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 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).

In table 7a, *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.

In table 7b, *sprinkler irrigation* systems vary in shape, size, and design depending on the needs of the crop grown and the soil type. These systems can be used on a relatively wide range of soils. Most sprinkler systems can be used on slopes of as much as 15 percent. Ponding, surface erodibility, and depth to a cemented pan or bedrock typically limit design and performance.

Drip or trickle irrigation systems are very efficient and are most economical for widely spaced crops, such as trees and vines. Slope generally is not a limitation, and the movement of water through the soil can be controlled by the application rate. Soil texture, movement of water through the soil, surface fragments, and available water capacity are less limiting with these systems than with other irrigation systems.

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine 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 8 gives the engineering classifications and the range of engineering 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, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

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.

Physical Properties of the Soils

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

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

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

The 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 linear extensibility, 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 (Ksat). The estimates in the table indicate the rate of water movement, in micrometers per second, 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 the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Erosion Properties of the Soils

Table 10 displays erosion-related soil properties for the layers of each soil in the survey area.

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

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

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

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

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

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the “National Soil Survey Handbook” (http://soils.usda.gov/technical/).

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

Chemical Properties of the Soils

Table 11 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 the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The 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 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. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

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

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table 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 13 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 can significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Soil slippage is a generic term for various erosion events, including landslides, soil creep, slumps, sluff, and mass wasting (figs. 13, 14, and 15). These terms all refer to and define specific processes of soil and bedrock dislocating to a lower slope position due to several factors of structural integrity. These are geomorphic processes that not only shape the landscape into identifiable landforms but also define how the land may be used. Soil slippage is evident in all of the geologic parent materials of Santa Catalina. However, soil slippage is dramatically more apparent in the geologic units of Catalina schist (Bohannon and Reiss, 1998).

Soil slippage potential is determined by observation of surface features that indicate whether a mass of soil will possibly slip when the vegetation is removed and soil water is at or near saturation or when the soil is undercut. Slippage is an important consideration for engineering practices and other land management practices. It is determined by observing slope, strike and dip, surface drainage patterns, and occurrences of such features as slip scars, differential scarps, fissures, and slumps.

Soil slippage is influenced by the angle of repose on the landscape. The angle of repose is defined as the steepest angle that bare soil will maintain. For natural soils the angle of repose is about 34 percent. Beyond this angle, soil and rocks are totally

Figure 13.—Evidence of the large mass wasting potential of Catalina schist. A surface fissure follows a differential in surface elevation near Starlight Peak.

Figure 14.—A block landslide typical in areas of Catalina schist. The concave position above shows where the material originated, and the flatter surface below shows where it was deposited.

under the influence of gravity and may slide downhill unless anchored by plants. Soils on Santa Catalina Island that have slopes of more than 34 percent are susceptible to soil slippage during dry periods. During periods of intense rainfall, the critical angle of repose will decrease, depending on soil type, rainfall, and other factors.

Underlying geology is another major influence on soil slippage potential. Differences in geology determine the extent of soil movement from limited surface erosion to soil creep, rotational slumps, and block landslides. Soils underlain by tilted sedimentary rock can be unstable and susceptible to slippage. Slopes with high angles of repose and distinct bedding planes are most susceptible to large mass wasting events. These steep slopes become more vulnerable when the bottom portion of the landform is undercut by a road or fluvial drainage. Soils in areas of previous slides are unstable and susceptible to slippage.

Areas with sedimentary beds that are perpendicular to the soil slope are much less susceptible to soil slippage than other areas. The protruding beds can act as anchors or barriers to soil movement. The angle of geologic bedding can change greatly over short distances; therefore, onsite investigation is recommended before structures are established.

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

Figure 15.—This small slump is in an area of Masthead-Dewpoint-Rock outcrop complex, 40 to 75 percent slopes. The area is typical of soils that have a high content of clay, formed in material weathered from schist bedrock, and are on steep slopes.

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 and chemical analyses of several typical pedons in the survey area are available online at http://ssldata.nrcs.usda.gov/querypage.asp. 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 "Soil Series and Their Morphology." The following is a list of soil samples analyzed by the National Soil Survey Laboratory in Lincoln, Nebraska.

Correlated soil name: Masthead
Lab pedon number: 06N0793
Site ID: s06037c037
33 degrees, 23 minutes, 39.4 seconds North latitude, 118 degrees, 26 minutes, 9.1 seconds West longitude, Santa Catalina Island, Los Angeles County, California, in the Channel Islands Soil Survey Area
Datum: NAD83—USGS Quad: Santa Catalina Island East

Correlated soil name: Masthead; not type location
Lab pedon number: 06N0792
Site ID: s06037c117
33 degrees, 24 minutes, 14.6 seconds North latitude, 118 degrees, 24 minutes, 8.3 seconds West longitude, Santa Catalina Island, Los Angeles County, California, in the Channel Islands Soil Survey Area
Datum: NAD83—USGS Quad: Santa Catalina Island East

Correlated soil name: Dewpoint
Lab pedon number: 06N0795
Site ID: s06037c111
33 degrees, 23 minutes, 44 seconds North latitude, 118 degrees, 26 minutes, 24 seconds West longitude, Santa Catalina Island, Los Angeles County, California, in the Channel Islands Soil Survey Area
Datum: NAD83—USGS Quad: Santa Catalina Island East

Correlated soil name: Freeboard
Lab pedon number: 06N0794
Site ID: s06037c064
33 degrees, 22 minutes, 14.2 seconds North latitude, 118 degrees, 22 minutes, 54.1 seconds West longitude, Santa Catalina Island, Los Angeles County, California, in the Channel Islands Soil Survey Area
Datum: NAD83—USGS Quad: Santa Catalina Island East

Correlated soil name: Oboship
Lab pedon number: 06N0796
Site ID: s06037c116
33 degrees, 19 minutes, 16.9 seconds North latitude, 118 degrees, 19 minutes, 25.3 seconds West longitude, Santa Catalina Island, Los Angeles County, California, in the Channel Islands Soil Survey Area
Datum: NAD83—USGS Quad: Santa Catalina Island East

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, 1996).

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all material less than 75 mm (3B1).
Coarse materials—(2-250 mm fraction) volume estimates of the percentages of all material greater than 2 mm (3B2).
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 (3A1d).
Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; $^1/_3$ or $^1/_{10}$ bar (4B1), 15 bars (4B2).
Water-retention difference—between $^1/_3$ bar and 15 bars for whole soil (4C1).
Water-retention difference—between $^1/_{10}$ bar and 15 bars for whole soil (4C2).
Bulk density—of material less than 2 mm, saran-coated clods field moist (4A1a), $^1/_3$ bar (4A1d), ovendry (4A1h).
Moist bulk density—of material less than 2 mm, cores (4A3).
Moist bulk density—of material less than 2 mm, compliant cavity (4A5).

Linear extensibility—change in clod dimension based on whole soil (4D).
Organic carbon—wet combustion. Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c).
Organic carbon—dry combustion (6A2d).
Total nitrogen—Kjeldahl (6B3).
Extractable cations—ammonium acetate pH 7.0, ICP; calcium (6N2i), magnesium (6O2h), sodium (6P2f), potassium (6Q2f).
Extractable cations—ammonium acetate pH 7.0, EDTA-alcohol separation; calcium (6N2a), magnesium (6O2a); flame photometry; sodium (6P2a), potassium (6Q2a).
Extractable acidity—barium chloride-triethanolamine IV (6H5a).
Cation-exchange capacity—ammonium acetate, pH 7.0, steam distillation (5A8b).
Cation-exchange capacity—sum of cations (5A3a).
Effective cation-exchange capacity—sum of extractable cations plus aluminum (5A3b).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1f).
Reaction (pH)—saturated paste (8C1b).
Reaction (pH)—potassium chloride (8C1g).
Reaction (pH)—sodium fluoride (8C1d).
Reaction (pH)—calcium chloride (8C1f).
Aluminum—potassium chloride extraction (6G9c).
Aluminum—acid oxalate extraction (6G12b).
Iron—acid oxalate extraction (6C9b).
Silica—acid oxalate extraction (6V2b).
Sesquioxides—dithionate-citrate extract; iron (6C2h), aluminum (6G7b), manganese (6D2g).
Soil resistivity—saturated paste (8E1).
Total soluble salts—estimate from resistivity (8A2).
Total soluble salts—estimate from conductivity (8D5).
Carbonate as calcium carbonate—(fraction less than 2 mm [80 mesh]) manometric (6E1h).
Carbonate as calcium carbonate—(fraction less than 20 mm) manometric (6E4).
Gypsum—precipitation in acetone (6F1a).
Soluble ions—acid titration, saturated paste; carbonate (6I1b), bicarbonate (6J1b).
Soluble ions—anion chromatograph, saturated paste; chloride (6K1f), sulfate (6L1f), nitrate (6M1f); fluoride (6U1d); nitrite (6W1d).
Electrical conductivity—saturation extract (8A3a).
Sodium adsorption ratio (5E).
Extractable phosphorus—Bray P-1 (6S3).
Available phosphorus—(method of reporting laboratory).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 14 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haploxeralfs (*Hapl*, meaning minimal horizonation, plus *xeralf*, the suborder of the Alfisols 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. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haploxeralfs.

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 loamy-skeletal, mixed, thermic Typic Haploxeralfs.

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

Soil Series and Their Morphology

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

Abaft Series

The Abaft series consists of very deep, excessively drained soils that formed in sandy eolian material derived from mixed sources. These soils are on stabilized dunes. Slopes range from 0 to 25 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Mixed, thermic Typic Xeropsamments

Typical pedon of Abaft loamy sand, under a vegetative cover of succulents and ripgut brome, on a beach at a elevation of 12 feet; on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands, near Whites Landing; 33 degrees, 23 minutes, 33.2 seconds north latitude and 118 degrees, 22 minutes, 12.5 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1—0 to 5 inches (0 to 12 centimeters); pale brown (10YR 6/3), stratified loamy sand, brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; neutral, pH 6.8 by phenol red; clear smooth boundary.

A2—5 to 13 inches (12 to 32 centimeters); pale brown (10YR 6/3), stratified loamy sand, brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; neutral, pH 6.8 by phenol red; clear smooth boundary.

2C—13 to 59 inches (32 to 150 centimeters); pale brown (10YR 6/3), stratified sand, brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; neutral, pH 6.8 by phenol red.

Range in characteristics

The mean annual soil temperature is 59 to 64 degrees F (15 to 18 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 10YR 7/2, 6/2, 6/3, or 6/4 and moist color of 10YR 5/2, 4/2, 4/3, or 4/4.

The texture is loamy sand or sand throughout the profile.The soils generally have no rock fragments, but in some pedons the content of these fragments is 1 to 2 percent.

Argixerolls

Argixerolls in this survey area consist of very deep, well drained soils that formed in mixed alluvium. These soils are on dissected flood plains and inset fans. Slopes range from 2 to 8 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Argixerolls

Example of a pedon of Argixerolls very gravelly sand, in an area of Typic Haploxerepts-Typic Xerofluvents-Argixerolls complex, 0 to 8 percent slopes, on a northeast-facing slope of 5 percent, under a cover of mule fat and annual grasses, at an elevation of 99 feet (28 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 20 seconds north latitude and 118 degrees, 21 minutes, 31 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Argixerolls in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 4 inches (0 to 9 centimeters); brown (10YR 4/3) very gravelly sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; 2 percent 75- to 250-millimeter fragments, 10 percent 5- to 75-millimeter fragments, and 30 percent 2- to 5-millimeter fragments; gradual wavy boundary.

C1—4 to 16 inches (9 to 41 centimeters); brown (10YR 4/3), stratified very gravelly sand to loamy sand, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; 22 percent 2- to 75-millimeter fragments; gradual wavy boundary.

2C2—16 to 38 inches (41 to 97 centimeters); grayish brown (10YR 5/2) very gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; massive; moderately hard, friable, moderately sticky, moderately plastic; common fine and medium interstitial pores; 1 percent 250- to 600-millimeter fragments, 9 percent 75- to 250-millimeter fragments, and 30 percent 2- to 75-millimeter fragments; abrupt wavy boundary.

3Bt—38 to 59 inches (97 to 200 centimeters); very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; massive; hard, friable, moderately sticky, moderately plastic; common medium interstitial and common coarse tubular pores; 30 percent faint very dark gray (10YR 3/1 moist) clay films on rock fragments; 5 percent rounded, 2- to 5-millimeter fragments.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 10YR 4/3 or 5/3 and moist color of 10YR 3/3 or 2/2. The texture is sand, very gravelly sand, gravelly loam, sandy loam, or gravelly sandy loam. The content of rock fragments generally is 0 to 42 percent. The content of clay is 3 to 18 percent.

The Bw or Bt horizon has dry color of 10YR 4/3 or 4/2 and moist color of 10YR 3/3 or 2/2. The texture is sand, very gravelly sand, gravelly loamy sand, sandy loam, or gravelly sandy loam. The content of rock fragments generally is 0 to 42 percent. The content of clay is 10 to 20 percent.

The C, 2C, and 3C horizons have dry color of 10YR 4/3 or 5/2 and moist color of 10YR 3/3 or 3/2. The texture is loam, very gravelly sandy clay loam, or fine sandy loam. The content of rock fragments generally is 0 to 40 percent. The content of clay is 5 to 25 percent.

Bosun Series

The Bosun series consists of deep, somewhat excessively drained soils that formed in material weathered from quartz-diorite porphyry (fig. 16). These soils are on the side slopes of interfluves on the hills and mountains of islands (fig. 17). Slopes range from 35 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Figure 16.—Typical profile of the Bosun soil in map unit 400, near Renton Mine Road. On the tape, depth is marked in centimeters.

Figure 17.—An area of map unit 400 (Oboship-Nauti-Bosun complex, 50 to 75 percent slopes). The Bosun soil is on the concave parts of the lower colluvial slopes, the Oboship soil is on the linear and convex upper slopes of the northern aspects, and the Nauti soil is on the drier southern aspects.

Taxonomic classification: Loamy-skeletal, mixed, superactive, isothermic Typic Argiustolls

Typical pedon of Bosun gravelly sandy loam, in an area of Oboship-Nauti-Bosun complex, 50 to 75 percent slopes, on a north-facing slope of 65 percent, under a cover of oaks, toyon, ceanothus, lemonade sumac, and laurel sumac, at an elevation of 607 feet (185 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 19 minutes, 54 seconds north latitude and 118 degrees, 19 minutes, 4 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 2 inches (0 to 5 centimeters); slightly decomposed oak leaves and grass; loose; abrupt wavy boundary.

Oe—2 to 6 inches (5 to 16 centimeters); moderately decomposed organic material; loose; abrupt wavy boundary.

A—6 to 14 inches (16 to 35 centimeters); dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky and granular structure; loose, very friable, nonsticky, nonplastic; common fine, common medium, and common very fine roots; common very fine interstitial pores; 18 percent 2- to 75-millimeter fragments; neutral, pH 6.6; clear wavy boundary.

Bt1—14 to 24 inches (35 to 60 centimeters); yellowish brown (10YR 5/6) gravelly loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, moderately plastic; common fine and common medium roots; common very fine interstitial pores; few clay bridges between grains; 15 percent 2- to 75-millimeter fragments; neutral, pH 7.2; clear wavy boundary.

Bt2—24 to 31 inches (60 to 80 centimeters); yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; loose, very friable, slightly sticky, moderately plastic; common fine and common very fine roots; clay films on all faces of peds and on rock fragments; 5 percent 75- to 250-millimeter fragments and 70 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.4; clear irregular boundary.

Bt3—31 to 47 inches (80 to 120 centimeters); yellowish brown (10YR 5/4) extremely gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; loose, very friable, slightly sticky, moderately plastic; common fine and common very fine roots; clay films on all faces of peds and on rock fragments; 20 percent 75- to 250-millimeter fragments and 80 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.4; clear irregular boundary.

Cr—47 inches (120 to 120 centimeters); moderately cemented, highly fractured quartz-diorite porphyry.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The difference between mean summer and mean winter temperatures is 4 to 5 degrees C. The soil moisture control section is dry in all parts from about mid-June to mid-November (about 150 days) and is usually moist the rest of the year.

The A horizon (including the A2 horizon where present) has dry color of 10YR 4/2 and moist color of 10YR 3/3 or 2/2. The texture is loam, gravelly loam, sandy loam, or gravelly sandy loam. The content of rock fragments generally is 10 to 20 percent. The content of clay is 5 to 18 percent.

The Bt1 horizon has dry color of 10YR 5/6 or 4/6 or 7.5YR 5/4 and moist color of 10YR 5/4 or 4/4 or 7.5YR 4/4. The texture is gravelly loam, very gravelly loam, or very gravelly sandy loam. The content of rock fragments generally is 15 to 45 percent, of which less than 10 is percent cobbles. The content of clay is 18 to 25 percent.

The Bt2 horizon has dry color of 10YR 5/6, 5/4, or 4/6 or 7.5YR 5/4 and moist color of 10YR 4/4 or 5/4 or 7.5YR 4/4. The texture is very gravelly sandy clay loam, very gravelly clay loam, or extremely gravelly sandy loam. The content of rock fragments generally is 45 to 85 percent, of which less than 10 is percent cobbles. The content of clay is 18 to 35 percent.

The Bt3 horizon, where present, has dry color of 10YR 5/4 or 2.5YR 6/6 and moist color of 10YR 4/4 or 2.5YR 4/6. The texture is extremely gravelly sandy clay loam, very gravelly clay loam, extremely gravelly sandy loam, or gravel. The content of rock fragments generally is 80 to 95 percent, of which less than 20 is percent cobbles. The content of clay is 20 to 38 percent.

The material in the Cr horizon consists of extremely weakly cemented to moderately cemented quartz-diorite fragments ranging to lithic quartz-diorite with fractures more than 10 centimeters apart. The upper part of the fractured Cr material commonly has distinct clay films on rock fragments and in some profiles would be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Calcic Haploxerolls

Calcic Haploxerolls in this survey area consist of very deep, well drained soils that formed in alluvium derived from quartz-diorite porphyry. These soils are on the bottom of canyons. Slopes range from 2 to 8 percent. The mean annual precipitation is about

12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine-loamy, mixed, superactive, thermic Calcic Haploxerolls

Example of a pedon of Calcic Haploxerolls loam, in an area of Typic Argixerolls-Calcic Haploxerolls-Urban land complex, 2 to 8 percent slopes, landscaped, on an east-facing slope of 2 percent, under a cover of landscaped grass, at an elevation of 131 feet (40 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 20 minutes, 4 seconds north latitude and 118 degrees, 19 minutes, 60 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Calcic Haploxerolls in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1—0 to 3 inches (0 to 7 centimeters); grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine and very fine roots; interstitial pores; 5 percent 2- to 5-millimeter fragments; neutral, pH 6.8; clear wavy boundary.

A2—3 to 10 inches (7 to 25 centimeters); grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; common fine and very fine roots; interstitial pores; 5 percent 2- to 5-millimeter fragments and 1 percent 5- to 75-millimeter fragments; neutral, pH 7.0; gradual wavy boundary.

A3—10 to 19 inches (25 to 47 centimeters); brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, moderately sticky, slightly plastic; common very fine roots; interstitial pores; 5 percent 2- to 5-millimeter fragments and 1 percent 5- to 75-millimeter fragments; neutral, pH 7.2; clear wavy boundary.

2Bk1—19 to 26 inches (47 to 65 centimeters); grayish brown (10YR 5/2) gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky, slightly plastic; common very fine roots; 5 percent faint carbonate coatings on rock fragments; 10 percent 2- to 5-millimeter fragments and 5 percent 5- to 75-millimeter fragments; slight effervescence, by 1 N HCl; slightly alkaline, pH 7.6; clear wavy boundary.

3Bk2—26 to 47 inches (65 to 120 centimeters); brown (10YR 5/3) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; in the matrix, 5 percent fine distinct light gray (10YR 7/1) carbonate masses with clear boundaries; slight effervescence, by 1 N HCl; slightly alkaline, pH 7.8; clear wavy boundary.

4Bk3—47 to 61 inches (120 to 200 centimeters); dark yellowish brown (10YR 4/4) loamy sand, dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, nonsticky, nonplastic; finely disseminated carbonates; 8 percent 2- to 5-millimeter fragments and 2 percent 5- to 75-millimeter fragments; very slight effervescence, by 1 N HCl; slightly alkaline, pH 7.8.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The typical pedon is located on a fairway of the Avalon golf course on Catalina Island. The mean annual soil temperature is 59 to 63 degrees F (15 to 17 degrees C).

The soil moisture control section is naturally dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The soils are irrigated.

Coastwise Series

The Coastwise series consists of shallow, well drained soils that formed in silty eolian material over slope alluvium and residuum derived from Catalina schist. These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 10 to 60 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Clayey, smectitic, thermic, shallow Mollic Haploxeralfs

Typical pedon of Coastwise gravelly sandy loam, in an area of Masthead-Coastwise-Dewpoint complex, 20 to 55 percent slopes, on a southwest-facing slope of 40 percent, under a cover of grass, sage, and lemonade sumac, at an elevation of 374 feet (114 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 14 seconds north latitude and 118 degrees, 28 minutes, 27 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch (0 to 1 centimeter); slightly decomposed plant material; thin platy structure; soft, nonsticky, nonplastic; 20 percent 75- to 250-millimeter fragments and 25 percent 2- to 75-millimeter fragments; abrupt smooth boundary.

A—1 to 6 inches (1 to 15 centimeters); brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; loose when dry and when moist, nonsticky, nonplastic; fine and medium interstitial pores; 20 percent 2- to 75-millimeter fragments; neutral, pH 7.0; clear smooth boundary.

2Bt1—6 to 15 inches (15 to 39 centimeters); dark grayish brown (10YR 4/2) sandy clay, very dark brown (10YR 2/2) moist; strong medium subangular blocky structure; very hard, friable, very sticky, very plastic; fine interstitial and very fine tubular pores; prominent clay films on all faces of peds and distinct clay films between sand grains; neutral, pH 7.2; clear wavy boundary.

2Bt2—15 to 18 inches (39 to 45 centimeters); dark yellowish brown (10YR 4/4) clay, dark yellowish brown (10YR 3/4) moist; strong medium subangular blocky structure; very hard, firm, very sticky, very plastic; fine and medium interstitial pores; prominent clay films on all faces of peds; neutral, pH 7.3; clear wavy boundary.

Cr—18 to 20 inches (45 to 50 centimeters); weakly cemented Catalina schist; fractures less than 10 centimeters apart; augerable.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

In the Oi horizon (where present), the content of rock fragments is 0 to 45 percent.

The A horizon has dry color of 10YR 5/3 or 7.5YR 4/4 or 4/3 and moist color of 10YR 3/3 or 3/2 or 7.5YR 3/2. The texture is sandy loam, gravelly sandy loam, very gravelly sandy loam, or silt loam. The content of rock fragments is 0 to 37 percent.

The 2Bt1 horizon has dry color of 10YR 4/2, 7.5YR 4/3 or 4/2, or 5YR 5/4 and moist color of 10YR 2/2; 7.5YR 3/3, 3/2, or 2/2; or 5YR 4/4. The texture is silty clay loam, clay loam, gravelly clay loam, sandy clay, or clay. The content of rock fragments is 0 to 20 percent.

The 2Bt2 and 2Bt3 horizons have dry color of 10YR 4/4 and moist color of 10YR 2/2 or 7.5YR 4/4. The texture is sandy clay, clay, or gravelly clay. The content of rock fragments is 0 to 20 percent.

The 2Cr material consists of extremely weakly cemented to moderately cemented Catalina schist, chlorite-actinolite-talc mélange, quartz-muscovite gneissoid, or green-hornblende gneiss fragments. An R layer occurs in some pedons. The thickness of the Cr horizon over the R layer varies. Lithic bedrock with fractures more than 10 centimeters apart typically occurs below the Cr horizon (below a depth of 50 centimeters). The upper part of the fractured Cr material commonly has clay films on rock fragments and in some pedons would be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Coastwise Series, Cobbly Phase

The Coastwise series consists of shallow, well drained soils that formed in silty eolian material over slope alluvium and residuum derived from Catalina schist. These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 10 to 60 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Clayey, smectitic, thermic, shallow Mollic Haploxeralfs

Typical pedon of Coastwise gravelly silt loam, in an area of Coastwise-Masthead complex, 40 to 75 percent slopes, cobbly, on a southwest-facing slope of 60 percent, under a cover of grass, bushy spikemoss, sage, and lemonade sumac, at an elevation of 489 feet (149 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 24 minutes, 48 seconds north latitude and 118 degrees, 27 minutes, 42 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 5 inches (1 to 12 centimeters); brown (7.5YR 4/3) gravelly silt loam, dark brown (7.5YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; 10 percent 75- to 250-millimeter fragments and 10 percent 2- to 75-millimeter fragments; clear wavy boundary.

Bt—6 to 17 inches (15 to 42 centimeters); reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; strong medium subangular blocky structure; hard, friable, very sticky, very plastic; prominent clay films on rock fragments and on all faces of peds; gradual wavy boundary.

Cr—17 to 20 inches (42 to 50 centimeters); moderately cemented Catalina schist; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. Rock fragments cover 50 to 60 percent of the surface. They are mostly gravel, cobbles, and a few stones. The depth to bedrock is 15 to 20 inches (37 to 50 centimeters). The particle-size control section averages 40 to 45 percent clay and 5 to 20 percent rock fragments, mostly gravel.

The A horizon has dry color of 10YR 5/3 or 7.5YR 4/4 or 4/3 and moist color of 10YR 3/3 or 3/2 or 7.5YR 3/2. The texture is sandy loam, gravelly sandy loam, very gravelly sandy loam, or silt loam. The content of rock fragments is 0 to 37 percent.

The Bt1 horizon has dry color of 10YR 4/2, 7.5YR 4/3 or 4/2, or 5YR 5/4 and moist color of 10YR 2/2; 7.5YR 3/3, 3/2, or 2/2; or 5YR 4/4. The texture is silty clay loam, clay loam, gravelly clay loam, sandy clay, or clay. The content of rock fragments is 0 to 20 percent.

The Bt2 and Bt3 horizons have dry color of 10YR 4/4 and moist color of 10YR 2/2 or 7.5YR 4/4. The texture is sandy clay, clay, or gravelly clay. The content of rock fragments is 0 to 20 percent.

The Cr material consists of extremely weakly cemented to moderately cemented Catalina schist, chlorite-actinolite-talc mélange, quartz-muscovite gneissoid, or green-hornblende gneiss fragments. An R layer occurs in some pedons. The thickness of the Cr horizon over the R layer varies. Lithic bedrock with fractures more than 10 centimeters apart typically occurs below the Cr horizon (below a depth of 50 centimeters). The upper part of the fractured Cr material commonly has clay films on rock fragments and in some pedons would be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Dewpoint Series

The Dewpoint series consists of moderately deep, well drained soils that formed in eolian deposits over slope alluvium and residuum derived from Catalina schist and metasedimentary rocks (fig. 18). These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 20 to 55 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 61 degrees F (16 degrees C).

Taxonomic classification: Fine, smectitic, isothermic Typic Paleustalfs

Figure 18.—Typical profile of Dewpoint soils under a canopy of Island Woodland. On the tape, depth is marked in centimeters.

Typical pedon of Dewpoint sandy loam, in an area of Dewpoint-Masthead-Coastwise complex, 20 to 55 percent slopes, on a northwest-facing slope of 42 percent, under a cover of toyon, oaks, and lemonade sumac, at an elevation of 682 feet (208 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 23 minutes, 44 seconds north latitude and 118 degrees, 26 minutes, 24 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch (0 to 3 centimeters); slightly decomposed plant material; moderate medium subangular blocky structure; 8 percent 2- to 75-millimeter, soft fragments; clear wavy boundary.

A1—1 to 6 inches (3 to 16 centimeters); very dark grayish brown (10YR 3/2) sandy loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky and moderate medium granular structure; soft, very friable, nonsticky, slightly plastic; few fine and common very fine roots throughout; common fine moderate-continuity interstitial and common very fine low-continuity tubular pores; 30 percent 2- to 75-millimeter fragments; slightly acid, pH 6.6 by pH meter 1:1 water; clear wavy boundary.

A2—6 to 11 inches (16 to 29 centimeters); pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; strong coarse subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common fine, few medium, and few very fine roots throughout; common fine moderate-continuity irregular and common very fine low-continuity tubular pores; continuous faint brown (10YR 4/3 moist) clay films on surfaces along root channels and continuous faint brown (10YR 4/3 moist) clay films between sand grains; 1 percent 75- to 250-millimeter cobbles and 34 percent 2- to 75-millimeter fragments; moderately acid, pH 6.1 by pH meter 1:1 water; clear wavy boundary.

Bt1—11 to 18 inches (29 to 46 centimeters); dark brown (7.5YR 3/3) very gravelly clay, dark brown (7.5YR 3/3) moist; moderate medium angular blocky structure; very hard, firm, very sticky, very plastic; common fine, common medium, and common very fine roots throughout; common very fine low-continuity tubular pores; continuous prominent very dark grayish brown (10YR 3/2 moist) clay films on rock fragments and continuous prominent very dark grayish brown (10YR 3/2 moist) clay films on all faces of peds; 7 percent 75- to 250-millimeter fragments and 30 percent 2- to 75-millimeter fragments; slightly acid, pH 6.4 by pH meter 1:1 water; gradual wavy boundary.

Bt2—18 to 33 inches (46 to 85 centimeters); dusky red (2.5YR 3/2) gravelly clay, dusky red (2.5YR 3/2) moist; moderate medium angular blocky structure; very hard, very firm, very sticky, very plastic; common medium roots throughout; common very fine low-continuity tubular pores; 85 percent continuous prominent very dark grayish brown (10YR 3/2 moist) clay films on rock fragments and 85 percent continuous prominent very dark grayish brown (10YR 3/2 moist) clay films on all faces of peds; 17 percent 75- to 250-millimeter fragments and 9 percent 2- to 75-millimeter fragments; neutral, pH 7.2 by pH meter 1:1 water; abrupt wavy boundary.

R—33 to 39 inches (85 to 100 centimeters); indurated Catalina Island schist; fractures more than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 69 degrees F (15 to 21 degrees C). The difference between mean summer and mean winter temperatures is 4 to 5 degrees C. The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. Mollic horizons range from 10 to

52 centimeters in thickness. Abrupt textural changes are accompanied by an increase in the content of clay. This increase ranges from 20 to 42 percent between the A and Bt horizons, generally within 2.5 to 10 centimeters in depth.

In the O horizon, the content of rock fragments is 0 to 35 percent.

The A1 and A2 horizons have dry color of 10YR 6/3, 5/3, 4/4, 4/2, or 3/2 or 7.5YR 3/4 and moist color of 10YR 4/3 3/3, 3/2, or 2/2 or 7.5YR 3/3 or 3/2. The texture is sandy loam, gravelly sandy loam, loam, or silt loam. The content of rock fragments is 0 to 35 percent.

The Bt1 and Bt2 horizons have dry color of 10YR 4/4 or 3/2 or 7.5YR 3/3 or 3/4 and moist color of 10YR 3/2 or 3/3 or 7.5YR 3/3 or 3/2. The texture is loam, clay loam, silty clay loam, silty clay, clay, gravelly clay, or very gravelly clay. The content of rock fragments is 0 to 45 percent.

The Bt3 and Btk horizons (where present) have dry color of 5Y 4/4 or 4/3 or 2.5Y 3/2 and moist color of 5Y 3/2. The texture is gravelly clay or sandy clay. The content of rock fragments is 0 to 30 percent.

The R layer is strongly cemented to indurated Catalina schist, green-hornblende gneiss, chlorite-actinolite-talc mélange, or quartz-muscovite gneissoid.

Express Series

The Express series consists of moderately deep, excessively drained soils that formed in material weathered from quartz-diorite igneous rock. These soils are on the side slopes of interfluves and in drainageways on the hills and mountains of islands. Slopes range from 2 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Coarse-loamy, mixed, active, thermic Typic Haploxerepts

Typical pedon of Express sandy loam, in an area of Express-Flyer-Loadline complex, 40 to 75 percent slopes, on a north-facing side slope of 75 percent, on a mountain interfluve, under a cover of sage, lemonade sumac, laurel sumac, and grasses, at an elevation of 1,446 feet (441 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 20 minutes, 49 seconds north latitude and 118 degrees, 23 minutes, 17 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 8 inches (0 to 20 centimeters); light brownish gray (10YR 6/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; many fine and very fine interstitial pores; 5 percent 2- to 75-millimeter fragments; slightly acid, pH 6.3 by pH meter 1:1 water; gradual wavy boundary.

Bw1—8 to 20 inches (20 to 52 centimeters); grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few very fine roots; many fine and very fine interstitial pores; faint clay films on rock fragments and between sand grains; 5 percent rounded, 2 to 75 millimeter quartz-diorite fragments; slightly acid, pH 6.4 by pH meter 1:1 water; abrupt wavy boundary.

Bw2—20 to 33 inches (52 to 85 centimeters); light yellowish brown (10YR 6/4) loamy sand, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; many fine and very fine interstitial pores; faint clay films on rock fragments; 10 percent 2- to 75-millimeter fragments; slightly acid, pH 6.5 by pH meter 1:1 water; gradual wavy boundary.

Cr—33 to 39 inches (85 to 98 centimeters); weakly cemented, highly fractured quartz-diorite porphyry; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 10YR 7/2, 6/2, 6/3, or 6/4 and moist color of 10YR 5/2, 4/2, 4/3, or 4/4. The texture is loamy sand, sandy loam, gravelly sandy loam, or fine sandy loam. The content of rock fragments is 0 to 20 percent.

The Bw1 horizon and the A2 horizon (where present) have dry color of 10YR 7/2, 6/2, 6/3, or 6/4 and moist color of 10YR 5/2, 4/2, 4/3, or 4/4. The texture is sandy loam, gravelly sandy loam, loam, gravelly loam, or gravelly fine sandy loam. The content of rock fragments is 0 to 25 percent.

The Bw2 horizon (where present) has dry color of 10YR 7/2, 6/2, 6/3, or 6/4 and moist color of 10YR 5/2, 4/2, 4/3, or 4/4. The texture is loamy sand, very gravelly loamy sand, sandy loam, gravelly sandy loam, or very gravelly sandy loam. The content of rock fragments is 0 to 40 percent.

The Cr horizon is extremely weakly cemented to moderately cemented quartz-diorite. In some pedons the Cr contact is fragmental. In these pedons the profile depth is more than 100 centimeters.

Express Series, Gullied Phase

The Express series consists of moderately deep to very deep, excessively drained soils that formed in material weathered from quartz-diorite igneous rock. These soils are in areas of eroded side slopes, interfluves, and drainageways on the hills and mountains of islands (fig. 19). Slopes range from 2 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Coarse-loamy, mixed, active, thermic Typic Haploxerepts

Typical pedon of Express sandy loam, in an area of Flyer, gullied-Express, gullied-Bosun complex, 15 to 50 percent slopes, on a west-facing slope of 27 percent, on the free face of a gully on a side slope of a mountain interfluve, under a cover of sage, lemonade sumac, laurel sumac, and grasses, at an elevation of 853 feet (260 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 19 minutes, 41 seconds north latitude and 118 degrees, 24 minutes, 34 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 14 inches (0 to 35 centimeters); pale brown (10YR 6/3) sandy loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; 5 percent 2- to 75-millimeter fragments; slightly acid, pH 6.3 by pH meter 1:1 water; diffuse wavy boundary.

Bw—14 to 30 inches (35 to 75 centimeters); light brown (7.5YR 6/3) gravelly sandy loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; 5 percent 2- to 75-millimeter fragments; slightly acid, pH 6.4 by pH meter 1:1 water; gradual wavy boundary.

BC—30 to 41 inches (75 to 105 centimeters); light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 4/4) moist; moderate fine granular structure; slightly hard, very friable, nonsticky, nonplastic; 10 percent 2- to 75-millimeter fragments; slightly acid, pH 6.5 by pH meter 1:1 water; gradual wavy boundary.

Figure 19.—An area of the highly eroded map unit 412 (Flyer, gullied-Express, gullied-Bosun complex, 15 to 50 percent slopes).

Cr—41 inches (105 centimeters); moderately cemented quartz-diorite bedrock; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The Cr horizon is extremely weakly cemented to moderately cemented quartz-diorite. In some pedons the Cr contact is fragmental. In these pedons the profile depth is more than 100 centimeters.

Flyer Series

The Flyer series consists of moderately deep, somewhat excessively drained soils that formed in material weathered from quartz-diorite igneous rock. These soils are on the side slopes of interfluves on the hills and mountains of islands. Slopes range from 20 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Coarse-loamy, mixed, active, thermic Typic Argixerolls

Typical pedon of Flyer sandy loam, in an area of Nauti-Flyer-Marpol complex, 25 to 55 percent slopes, on a south facing slope of 42 percent, under a cover of grass, at an elevation of 1,082 feet (330 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 20 minutes, 20.7 seconds north latitude and 118 degrees, 24 minutes, 13.7 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 4 inches (0 to 10 centimeters); brown (10YR 5/3) gravelly loamy sand, dark brown (7.5YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; many very fine interstitial pores; 20 percent 2- to 75-millimeter quartz-diorite fragments; strongly acid, pH 5.4 by pH meter 1:1 water; clear wavy boundary.

Bt1—4 to 13 inches (10 to 33 centimeters); brown (10YR 5/3) gravelly sandy loam, dark brown (7.5YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few fine and very fine roots; common very fine interstitial pores; faint clay films on all faces of peds and between sand grains; 20 percent 2- to 75-millimeter fragments; moderately acid, pH 5.7 by pH meter 1:1 water; clear wavy boundary.

Bt2—13 to 28 inches (33 to 70 centimeters); yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine tubular and common very fine interstitial pores; distinct clay films on all faces of peds and between sand grains; 40 percent 2- to 75-millimeter fragments; slightly acid, pH 6.3 by pH meter 1:1 water; clear wavy boundary.

Bt3—28 to 35 inches (70 to 90 centimeters); light yellowish brown (10YR 6/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/6) moist; massive; slightly hard, very friable, moderately sticky, moderately plastic; few very fine tubular and common very fine interstitial pores; distinct clay films on all faces of peds and between sand grains; 60 percent 2- to 75-millimeter fragments; slightly acid, pH 6.4 by pH meter 1:1 water; clear wavy boundary.

Cr—35 to 39 inches (90 to 100 centimeters); moderately cemented, highly fractured quartz-diorite porphyry; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The Oi horizon (where present) ranges from 0 to 5 centimeters in thickness.

The A horizon (including the A2 horizon where present) has dry color of 10YR 5/3, 4/4, or 4/2 and moist color of 10YR 3/3 or 2/2 or 7.5YR 3/3. The texture is sandy loam, loamy sand, or gravelly loamy sand. The content of rock fragments is 0 to 20 percent.

The Bt1 horizon has dry color of 10YR 6/6, 5/3, or 4/3 and moist color of 10YR 5/4, 4/6, 4/4, 4/3, or 3/3 or 7.5YR 3/3. The texture is sandy loam, loamy sand, gravelly loamy sand, loam, or very gravelly sandy clay loam. The content of rock fragments is 0 to 20 percent.

The Bt2 horizon has dry color of 10YR 6/4 or 5/4 or 2.5Y 5/4 and moist color of 10YR 5/4, 4/6, or 4/4 or 7.5YR 4/4. The texture is sandy loam, very gravelly sandy loam, loam, or very gravelly loam. The content of rock fragments is 1 to 40 percent.

The Bt3 horizon (where present) has dry color of 10YR 6/4 and moist color of 10YR 4/6. The texture is sandy loam or very gravelly sandy clay loam. The content of rock fragments is 1 to 60 percent.

The Cr horizon is extremely weakly cemented to moderately cemented quartz-diorite. In some pedons the Cr contact is fragmental. In these pedons the profile depth is more than 100 centimeters.

Flyer Series, Gullied Phase

The Flyer series consists of moderately deep, somewhat excessively drained soils that formed in material weathered from quartz-diorite igneous rock. These soils are on the side slopes of interfluves on the hills and mountains of islands. Slopes range from 20 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Coarse-loamy, mixed, active, thermic Typic Argixerolls

Typical pedon of Flyer gravelly loamy sand, in an area of Flyer, gullied-Express, gullied-Bosun complex, 15 to 50 percent slopes, on a slope of 30 percent, under a cover of grass, at an elevation of 1,190 feet (363 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 20 minutes, 31.5 seconds north latitude and 118 degrees, 24 minutes, 46.7 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island South.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 4 inches (0 to 11 centimeters); yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 3/3) moist; soft, very friable, nonsticky, nonplastic.

Bw—4 to 9 inches (11 to 24 centimeters); very pale brown (10YR 7/4) loamy sand, yellowish brown (10YR 5/4) moist; soft, very friable, nonsticky, nonplastic.

Bt—9 to 24 inches (24 to 60 centimeters); brown (7.5YR 5/4) sandy loam, brown (7.5YR 5/4) moist; moderately hard, friable, slightly sticky, slightly plastic; 25 percent distinct clay films between sand grains and 25 percent distinct clay films on all faces of peds.

Cr—24 to 33 inches (60 to 85 centimeters); moderately cemented quartz-diorite bedrock; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

Freeboard Series

The Freeboard series consists of deep, well drained soils that formed in residuum derived from andesite and volcanic rock (fig. 20). These soils are on the side slopes of interfluves on the hills and mountains of islands. Slopes range from 5 to 65 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine, smectitic, thermic Vertic Haploxeralfs

Typical pedon of Freeboard clay loam, in an area of Tongva-Freeboard-Starbright complex, 30 to 55 percent slopes, on a west-facing slope of 33 percent, under a cover of annual and perennial grasses, near scattered lemonade sumac and sage, at an elevation of 1,178 feet (389 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 14.2 seconds north latitude and 118 degrees, 22 minutes, 54.1 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Figure 20.—Typical profile of Freeboard soils, which occur under grass and sage in the Coastal Sage Scrub. A high content of clay in the surface layer and the shrink-swell potential are defining characteristics. On the tape, depth is marked in centimeters.

A1—0 to 1 inch (0 to 2 centimeters); dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular and moderate thin platy structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine roots throughout; common fine moderate-continuity interstitial and common fine moderate-continuity irregular pores; 5 percent 2- to

75-millimeter fragments; slightly acid, pH 6.4 by pH meter 1:2 calcium chloride; abrupt wavy boundary.

A2—1 to 5 inches (2 to 13 centimeters); dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky and moderate medium granular structure; slightly hard, friable, slightly sticky, moderately plastic; common fine and very fine roots throughout; common fine moderate-continuity interstitial and irregular and very fine low-continuity tubular pores; 10 percent 2- to 75-millimeter fragments; neutral, pH 6.7 by pH meter 1:2 calcium chloride; clear wavy boundary.

Bt1—5 to 11 inches (13 to 28 centimeters); dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong coarse subangular blocky structure; hard, firm, moderately sticky, moderately plastic; common very fine roots throughout; common fine moderate-continuity interstitial and irregular and very fine low-continuity tubular pores; continuous prominent very dark grayish brown (10YR 3/2 moist) clay films on rock fragments and on all faces of peds; 10 percent 2- to 75-millimeter fragments; neutral, pH 6.9 by pH meter 1:2 calcium chloride; clear wavy boundary.

Bt2—11 to 24 inches (28 to 60 centimeters); 40 percent dark grayish brown (10YR 4/2) and 60 percent brown (7.5YR 4/3) clay loam, 40 percent very dark grayish brown (10YR 3/2) and 60 percent dark brown (7.5YR 3/3) moist; moderate coarse prismatic and strong coarse angular blocky structure; very hard, firm, moderately sticky, very plastic; common very fine roots throughout; common very fine low-continuity tubular pores; continuous distinct brown (7.5YR 4/3 moist) clay films on rock fragments and on all faces of peds; 5 percent 2- to 75-millimeter fragments; neutral, pH 7.0 by pH meter 1:2 calcium chloride; abrupt wavy boundary.

Btk1—24 to 35 inches (60 to 90 centimeters); 40 percent very dark grayish brown (10YR 3/2) and 60 percent yellowish brown (10YR 5/4) gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate coarse prismatic and strong coarse angular blocky structure; very hard, firm, moderately sticky, very plastic; common very fine low-continuity interstitial and tubular pores; 85 percent continuous prominent very dark grayish brown (10YR 3/2 moist) clay films on rock fragments and on all faces of peds; in the matrix, 3 percent fine faint irregular light gray (10YR 7/2 dry) carbonate masses with clear boundaries; 15 percent 2- to 75-millimeter fragments; slight effervescence, by 1 N HCl; moderately alkaline, pH 7.9 by pH meter 1:2 calcium chloride; gradual wavy boundary.

Btk2—35 to 51 inches (90 to 130 centimeters); 40 percent very dark grayish brown (10YR 3/2) and 60 percent yellowish brown (10YR 5/4) very gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; moderately hard, friable, moderately sticky, moderately plastic; common very fine low-continuity interstitial pores; 85 percent continuous prominent very dark grayish brown (10YR 3/2 moist) clay films on rock fragments and on all faces of peds; in the matrix, 5 percent fine distinct irregular light gray (10YR 7/2 dry) carbonate masses with clear boundaries; around rock fragments, 3 percent fine faint irregular light gray (10YR 7/2 dry) carbonate masses with clear boundaries; 30 percent 2- to 5-millimeter fragments and 50 percent 2- to 75-millimeter fragments; slight effervescence, by 1 N HCl; moderately alkaline, pH 8.1 by pH meter 1:2 calcium chloride; clear wavy boundary.

Cr—51 to 61 inches (130 to 155 centimeters); moderately cemented andesite; fractures less than 10 centimeters apart; loose and augerable.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The LEP ranges from 3 to 9. Vertical cracks are faint to prominent (2 millimeters by 5 centimeters to 2 centimeters by 30 centimeters) from the soil surface to a depth of 150 centimeters. A few faint slickensides and wedge-shaped aggregates are throughout profile.

The A horizon has dry color of 10YR 5/2, 4/2, or 3/3 and moist color of 10YR 3/2 or 2/2 or 7.5YR 3/2. The texture is loam, silty clay loam, or clay loam. The content of rock fragments is 0 to 10 percent. The content of clay is 20 to 40 percent.

The Bt or Bss horizon has dry color of 10YR 3/2 or 3/3 or 7.5YR 4/2 and moist color of 10YR 3/1 or 2/2 or 7.5YR 3/2. The texture is silty clay loam, clay loam, or clay. The content of rock fragments is 0 to 10 percent. The content of clay is 30 to 45 percent.

The BC or Btk horizon has dry color of 10YR 5/4 or 3/2 or 2.5Y 6/1 or 5/2 and moist color of 10YR 3/3 or 2.5YR 5/2 or 2/2. The texture is gravelly sandy loam, very gravelly sandy loam, clay loam, gravelly clay loam, or gravelly sandy clay loam. The content of rock fragments is 10 to 50 percent. The content of clay is 16 to 25 percent.

The Cr material consists of extremely weakly cemented to moderately cemented andesite fragments and can include lithic andesite with fractures more than 10 centimeters apart. The upper part of the fractured Cr material commonly has distinct clay films on rock fragments and in some pedons would be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Haploxeralfs

Haploxeralfs in this survey area consist of deep or very deep, well drained soils that formed in residuum derived from volcanic rock. These soils are on the interfluves of mountains. Slopes range from 15 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Haploxeralfs

Example of a pedon of Haploxeralfs clay loam, in an area of Luff-Haploxerepts-Haploxeralfs complex, 15 to 35 percent slopes, on a slope of 60 percent, under a cover of perennial grasses, at an elevation of 1,378 feet (420 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 23 minutes, 25 seconds north latitude and 118 degrees, 23 minutes, 58 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Haploxeralfs in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 1 inch (0 to 3 centimeters); dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; moderately hard, moderately sticky, moderately plastic; common very fine pores; distinct clay films; 5 percent 2- to 75-millimeter fragments; clear wavy boundary.

Bt1—1 to 16 inches (3 to 40 centimeters); brown (7.5YR 4/3) clay, dark brown (7.5YR 3/2) moist; hard, very sticky, very plastic; prominent clay films on all faces of peds; 5 percent 2- to 75-millimeter fragments; gradual wavy boundary.

Bt2—16 to 26 inches (40 to 65 centimeters); brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; 50 percent clay; very hard, very sticky, very plastic; prominent clay films on all faces of peds; 4 percent 75- to 250-millimeter fragments and 5 percent 2- to 75-millimeter fragments; gradual wavy boundary.

Bt3—26 to 39 inches (65 to 100 centimeters); brown (7.5YR 4/3) clay, dark brown (7.5YR 3/3) moist; very hard, moderately sticky, moderately plastic; prominent clay films on all faces of peds and between sand grains; 10 percent 2- to 75-millimeter fragments; gradual wavy boundary.

Bt4—39 to 79 inches (100 to 200 centimeters); dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; hard, moderately sticky, moderately plastic; prominent clay films between sand grains, on all faces of peds, and on rock fragments; 5 percent 2- to 75-millimeter fragments and 10 percent 75- to 250-millimeter fragments.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

Profile depths range from 45 to more than 200 centimeters. Particle-size classes are fine, loamy, or loamy-skeletal.

Haploxerepts

Haploxerepts in this survey area consist of well drained soils that formed in residuum derived from andesite, other volcanic rock, and quartz-diorite rock. These soils are on steep coastal bluffs and interfluves on the hills and mountains of islands. Slopes range from 15 to 120 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Haploxerepts

Example of a pedon of Haploxerepts loamy sand, in an area of Haploxerepts-Purser-Rock outcrop complex, 40 to 75 percent slopes, on a southeast-facing slope of 55 percent, under a cover of perennial grasses, at an elevation of 1,893 feet (577 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 45 seconds north latitude and 118 degrees, 24 minutes, 58 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Haploxerepts in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 1 inch (0 to 3 centimeters); brown (10YR 5/3) loamy sand, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; common very fine interstitial and few very fine tubular pores; 5 percent rounded, 75- to 250-millimeter fragments; slightly acid, pH 6.2 by pH meter 1:1 water; clear wavy boundary.

Bw—1 to 16 inches (3 to 40 centimeters); yellowish brown (10YR 5/4) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; strong very fine granular and strong fine subangular blocky structure; soft, very friable, nonsticky, slightly plastic; common very fine tubular pores; 5 percent 75- to 250-millimeter fragments and 40 percent 2- to 75-millimeter fragments; slightly acid, pH 6.5 by pH meter 1:1 water; gradual wavy boundary.

BC—16 to 30 inches (40 to 75 centimeters); light brownish gray (10YR 6/2) very gravelly sandy loam, brown (7.5YR 4/3) moist; single grain; loose, very friable, nonsticky, nonplastic; interstitial pores; 2 percent patchy faint clay films on rock fragments; 15 percent 75- to 250-millimeter fragments and 50 percent 2- to 75-millimeter fragments; slightly acid, pH 6.4 by pH meter 1:1 water; gradual wavy boundary.

Cr—30 to 49 inches (75 to 125 centimeters); moderately cemented bedrock; fractures less than 10 centimeters apart.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The depth to bedrock is 40 to 120 centimeters. The bedrock is fractured paralithic or lithic volcanic rock. The particle-size control section averages 8 to 14 percent clay and 10 to 73 percent rock fragments. Rock fragments cover 20 to 65 percent of the surface.

The A horizon has dry color of 10YR 6/3, 6/2, 5/4, or 5/3 and moist color of 10YR 4/2, 3/3, or 3/2. The texture is sandy loam or gravelly sandy loam. The content of rock fragments is 5 to 25 percent. The content of clay is 8 to 10 percent.

The Bw horizon has dry color of 10YR 6/3, 6/2, 5/4, or 4/4 or 7.5YR 7/2 and moist color of 10YR 4/3, 3/4, 3/3, or 3/2 or 7.5YR 4/3. The texture is very gravelly loam, extremely gravelly loam, gravelly sandy loam, very gravelly sandy loam, or extremely gravelly loamy sand. The content of rock fragments is 20 to 90 percent. The content of clay is 5 to 15 percent.

The BC horizon has moist color of 10YR 4/3 or 7.5YR 4/3. The content of clay is 8 to 10 percent.

The Cr material consists of extremely weakly cemented to moderately cemented andesite fragments and can include lithic andesite with fractures more than 10 centimeters apart. The upper part of the fractured Cr material commonly has fragments and could be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Loadline Series

The Loadline series consists of shallow, excessively drained soils that formed in residuum and slope alluvium derived from quartz-diorite igneous rock. These soils are on the side slopes of hills and mountains. Slopes range from 10 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Loamy, mixed, active, thermic, shallow Typic Argixerolls

Typical pedon of Loadline sandy loam, in an area of Flyer-Loadline-Nauti complex, 15 to 50 percent slopes, on a northeast-facing slope of 45 percent, under a cover of white sage, at an elevation of 1,472 feet (449 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 20 minutes, 38 seconds north latitude and 118 degrees, 21 minutes, 34 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch (0 to 2 centimeters); slightly decomposed plant material; loose; abrupt wavy boundary.

A—1 to 2 inches (2 to 6 centimeters); dark yellowish brown (10YR 4/4) sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; loose, very friable, nonsticky, slightly plastic; slightly acid, pH 6.7 by pH meter 1:1 water; abrupt wavy boundary.

Bt1—2 to 8 inches (6 to 20 centimeters); brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; common fine and very fine tubular pores; faint clay films between sand grains and on surfaces along root channels; slightly acid, pH 6.9 by pH meter 1:1 water; clear wavy boundary.

Bt2—8 to 15 inches (20 to 38 centimeters); light yellowish brown (10YR 6/4) sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine and very fine roots; common fine tubular and common very fine interstitial pores; faint clay films on surfaces along root channels and faint clay bridges between sand grains; 5 percent 2- to 75-millimeter fragments; slightly acid, pH 6.9 by pH meter 1:1 water; clear wavy boundary.

Cr—15 to 18 inches (38 to 45 centimeters) moderately cemented, highly fractured quartz-diorite porphyry; fractures less than 10 centimeters apart; few very fine roots in fractures.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 10YR 7/2, 6/2, 6/3, or 6/4 and moist color of 10YR 5/2, 4/2, 4/3, or 4/4. The texture is loamy sand, sandy loam, gravelly sandy loam, or sand. The horizon generally has no rock fragments, but in some pedons the content of these fragments is 1 to 20 percent.

The Bt horizons have dry color of 10YR 7/2, 6/2, 6/3, or 6/4 and moist color of 10YR 5/2, 4/2, 4/3, or 4/4. The texture is sandy loam, loam, gravelly loam, or very gravelly loam. The content of rock fragments is 5 to 60 percent.

The Cr material consists of very weakly cemented to moderately cemented quartz-diorite fragments. It has fractures less than 10 centimeters apart. The upper part of the fractured Cr material commonly has distinct clay films on rock fragments and in some pedons would be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Luff Series

The Luff series consists of moderately deep, well drained soils that formed in silty eolian material over residuum derived from andesite and schist (fig. 21). These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 15 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine, smectitic, thermic Vertic Palexeralfs

Typical pedon of Luff silty loam, in an area of Luff-Haploxerepts-Haploxeralfs complex, 15 to 35 percent slopes, on a southwest-facing slope of 22 percent, under a cover of annual grasses surrounded by lemonade sumac, scrub oaks, and toyon, at an elevation of 1,112 feet (339 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 23 minutes, 46 seconds north latitude and 118 degrees, 23 minutes, 19 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

Figure 21.—Typical profile of Luff soils. Currently, these soils commonly support grasslands. Because of the silty eolian mantle, they are highly erosive if the surface is disturbed. On the tape, depth is marked in centimeters.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1—0 to 4 inches (0 to 9 centimeters); brown (7.5YR 4/3) gravelly silt loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; moderately hard, very friable, slightly sticky, nonplastic; many very fine roots; 5 percent 75- to 250-millimeter rock fragments and 15 percent 2- to 75-millimeter rock fragments; slightly acid, pH 6.2; clear wavy boundary.

A2—4 to 10 inches (9 to 25 centimeters); brown (7.5YR 4/3) very gravelly silt loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine roots; 3 percent discontinuous faint clay bridges between sand grains and on surfaces along root channels and 90 percent continuous prominent silt coatings on all faces of peds; 40 percent rounded, 2- to 75-millimeter rock fragments; slightly acid, pH 6.3; abrupt wavy boundary.

2Bt1—10 to 22 inches (25 to 55 centimeters); dark reddish brown (5YR 3/2) clay, dark reddish brown (5YR 2.5/2) moist; strong medium subangular blocky structure; very hard, firm, very sticky, very plastic; continuous prominent clay films on all faces of peds; 5 percent rounded, 2- to 75-millimeter rock fragments; neutral, pH 6.8; clear wavy boundary.

2Bt2—22 to 26 inches (55 to 65 centimeters); reddish brown (5YR 4/4) clay, dark reddish brown (5YR 2.5/2) moist; moderate medium subangular blocky structure; very hard, firm, very sticky, very plastic; continuous prominent clay films on all faces of peds; 10 percent rounded, 2- to 75-millimeter rock fragments; neutral, pH 6.9; abrupt wavy boundary.

2R—26 to 27 inches (65 to 68 centimeters); strongly cemented andesite; fractures more than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A1 and A2 horizons generally have dry color of 10YR 5/3 or 4/2 or 7.5YR 5/2, 4/3, or 4/2 and moist color of 10YR 4/3, 4/2, 3/3, or 2/2 or 7.5YR 3/2 or 2.5/2. In some pedons the A horizon has dry value of 6 or more and moist value of 4. The texture is sandy loam, fine sandy loam, gravelly sandy loam, loam, silt loam, gravelly silt loam, or very gravelly silt loam. The content of rock fragments is 0 to 40 percent.

The 2Bt1 horizon has dry color of 10YR 5/2 or 3/3, 7.5YR 3/4, or 5YR 5/3, 4/4, or 3/3 and moist color of 10YR 4/2, 3/4, 3/3, or 3/2; 7.5YR 3/2; or 5YR 2.5/2. The texture is gravelly clay loam or clay. The content of rock fragments is 0 to 15 percent.

The 2R layer consists of strongly cemented or very strongly cemented, angular and fractured volcanic and schist rocks.

Marpol Series

The Marpol series consists of deep, well drained soils that formed in residuum derived from quartz-diorite rock. These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 25 to 70 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine, mixed, superactive, thermic Typic Palexerolls

Typical pedon of Marpol gravelly loam, in an area of Nauti-Flyer-Marpol complex, 25 to 55 percent slopes, on a southwest-facing slope of 50 percent, under a cover of sage and grass, at an elevation of 1,234 feet (376 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 18 minutes, 47 seconds north latitude and 118 degrees, 19 minutes, 8 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 1 inch (0 to 3 centimeters); brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate thick platy structure; soft, very friable, slightly sticky, slightly plastic; common very fine interstitial pores; 15 percent 2- to 75-millimeter fragments; neutral, pH 7.1 by pH meter 1:1 water; abrupt wavy boundary.

Bt1—1 to 9 inches (3 to 25 centimeters); brown (7.5YR 5/3) clay loam, dark brown (7.5YR 3/3) moist; moderate medium subangular blocky structure; moderately hard, friable, moderately sticky, moderately plastic; common very fine tubular and interstitial pores; discontinuous distinct clay films on all faces of peds and on rock fragments; 5 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.5 by pH meter 1:1 water; clear wavy boundary.

Bt2—9 to 28 inches (24 to 70 centimeters); brown (7.5YR 5/4) clay, strong brown (7.5YR 4/6) moist; strong coarse subangular blocky structure; hard, firm, very sticky, very plastic; continuous prominent clay films on all faces of peds and discontinuous prominent clay films on rock fragments; 5 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.7 by pH meter 1:1 water; gradual wavy boundary.

Bt3—28 to 41 inches (70 to 105 centimeters); brown (7.5YR 5/4) clay, strong brown (7.5YR 4/6) moist; massive; very hard, firm, very sticky, very plastic; continuous distinct clay films on all faces of peds; throughout the horizon, 5 percent fine faint irregular very weakly cemented black (10YR 2/1) iron-manganese masses with sharp boundaries and 10 percent fine prominent irregular reddish yellow (7.5YR 6/8) masses of oxidized iron with sharp boundaries; 5 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.6 by pH meter 1:1 water; abrupt irregular boundary.

R—41 to 45 inches (105 to 115 centimeters); strongly cemented quartz-diorite porphyry bedrock; fractures more than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The depth to paralithic or lithic contact is more than 100 centimeters. The bedrock ranges from angular indurated quartz-diorite rock with fractures more than 10 centimeters apart to hard quartz-diorite rock with fractures less than 10 centimeters apart. The mollic epipedon ranges from 25 to 70 centimeters in thickness and in some pedons includes the upper part of the argillic horizon.

Some pedons have an Oi horizon, which consists of oak litter or grass and is 1 to 4 centimeters thick.

The A horizon has dry color of 10YR 5/4, 5/3, 4/3, 4/2, or 3/2 or 7.5YR 5/3 and moist color of 10YR 3/3, 3/2, or 2/2 or 7.5YR 3/2. The texture is sandy loam, loam, gravelly loam, or gravelly sandy loam. The content of rock fragments is 5 to 20 percent. The content of clay is 5 to 14 percent.

The Bt1 and Bt2 horizons have dry color of 10YR 6/4, 5/6, 4/3, or 3/3; 7.5YR 5/4 or 5/6; or 2.5Y 5/4. They have moist color of 10YR 4/4, 4/3, 3/3, or 3/2; 7.5YR 4/6 or 4/4; or 2.5Y 4/4. The texture is clay loam, clay, or silty clay loam. The content of rock fragments is 5 to 10 percent. The content of clay is 25 to 50 percent.

The Bt3 horizon has dry color of 10YR 6/4, 7.5YR 5/6 or 5/4, or 2.5Y 6/4 or 5/4 and moist color of 10YR 4/4 or 3/4, 7.5YR 4/6 or 4/4, or 2.5Y 4/4. The texture is clay loam, clay, or gravelly to extremely gravelly clay loam. The content of rock fragments is 5 to 80 percent. The content of clay is 35 to 50 percent.

The R layer is angular, indurated to strongly cemented quartz-diorite rock. It has fractures more than 10 centimeters apart.

Masthead Series

The Masthead series consists of moderately deep, well drained soils that formed in silty eolian material over residuum derived from schist and metasedimentary rock. These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 15 to 55 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine, smectitic, thermic Mollic Palexeralfs

Typical pedon of Masthead gravelly silty loam, in area of Masthead-Coastwise-Dewpoint complex, 20 to 55 percent slopes, on a southwest-facing slope of 30 percent, under a cover of California sage, bushy spikemoss, lemonade sumac, scrub oaks, and toyon, at an elevation of 790 feet (241 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 23 minutes, 39 seconds north latitude and 118 degrees, 26 minutes, 9 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 4 inches (0 to 11 centimeters); brown (7.5YR 5/4) gravelly silt loam, dark brown (7.5YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, loose, slightly sticky, slightly plastic; common very fine roots; 5 percent 75- to 250-millimeter fragments and 10 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.7 by pH meter 1:1 water; clear wavy boundary.

2Bt1—4 to 11 inches (11 to 29 centimeters); reddish brown (5YR 5/3) clay, dark reddish brown (5YR 3/3) moist; strong medium angular blocky structure; hard, firm, very sticky, very plastic; common medium and very fine roots; prominent clay films on rock fragments and on all faces of peds; 10 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.6 by pH meter 1:1 water; clear wavy boundary.

2Bt2—11 to 30 inches (29 to 75 centimeters); reddish brown (5YR 5/3) gravelly clay, dark reddish brown (5YR 3/3) moist; moderate medium angular blocky structure; hard, firm, very sticky, very plastic; prominent clay films on rock fragments and on all faces of peds; 15 percent 75- to 250-millimeter fragments and 15 percent 2- to 75-millimeter fragments; moderately alkaline, pH 7.9 by pH meter 1:1 water; abrupt wavy boundary.

2Cr—30 to 39 inches (75 to 100 centimeters); moderately cemented Catalina schist; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon (including an A2 horizon in some pedons) has dry color of 10YR 5/4 or 5/3; 7.5YR 6/4, 4/4, or 5/3; or 2.5Y 7/3. It has moist color of 10YR 4/4; 7.5YR 3/3, 3/2, or 2.5/2; or 2.5Y 4/2. The texture is sandy loam, very gravelly sandy loam, silt loam, gravelly silt loam, or very gravelly silt loam. The content of rock fragments is 0 to 35 percent.

The 2Bt1 horizon has dry color of 10YR 5/2 or 3/3, 7.5YR 3/4, or 5YR 5/3 and moist color of 10YR 3/3, 7.5YR 3/3 or 3/2, or 5YR 3/3. The texture is clay loam, gravelly silt loam, or clay. The content of rock fragments is 0 to 45 percent.

The 2Bt2 horizon has dry color of 10YR 3/2, 5YR 5/3, or 5Y 5/2 and moist color of 10YR 4/3 or 3/3, 7.5YR 3/3 or 3/2, or 5YR 3/3. The texture is silt loam, gravelly silty clay loam, sandy clay, clay loam, clay, or gravelly clay. The content of rock fragments is 0 to 30 percent.

The 2Bt3 horizon has dry color of 5YR 5/4 or 2.5Y 4/3 and moist color of 10YR 4/3 or 2.5Y 4/3 or 3/2. The texture is silty clay loam, gravelly silty clay, clay loam, very gravelly clay loam, or clay. The content of rock fragments is 0 to 20 percent.

The 2Cr horizon consists of moderately cemented Catalina schist or green-hornblende gneiss or extremely weakly cemented chlorite-actinolite-talc mélange and quartz-muscovite gneissoid. The upper part of the 2Cr material commonly has fragments with clay films and could be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Masthead Series, Cobbly Phase

The Masthead series consists of moderately deep, well drained soils that formed in silty eolian material over residuum derived from schist and metasedimentary rock. These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 15 to 55 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine, smectitic, thermic Mollic Palexeralfs

Typical pedon of Masthead gravelly silt loam, in an area of Coastwise-Masthead complex, 40 to 75 percent slopes, under a cover of California sage, bushy spikemoss, lemonade sumac, scrub oaks, and toyon, at an elevation of 410 feet (125 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 24 minutes, 47 seconds north latitude and 118 degrees, 27 minutes, 45 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1—0 to 1 inch (0 to 2 centimeters); brown (7.5YR 4/3) gravelly silt loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; 5 percent 75- to 250-millimeter fragments and 15 percent 2- to 75-millimeter fragments; abrupt smooth boundary.

A2—1 to 6 inches (2 to 15 centimeters); brown (7.5YR 4/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, moderately sticky, moderately plastic; 10 percent 2- to 75-millimeter fragments; abrupt wavy boundary.

2Bt1—6 to 16 inches (15 to 40 centimeters); reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; strong medium subangular blocky structure; hard, firm, very sticky, very plastic; distinct clay films on rock fragments; 10 percent 2- to 75-millimeter fragments; clear wavy boundary.

2Bt2—16 to 30 inches (40 to 76 centimeters); reddish brown (5YR 5/3) very gravelly clay, reddish brown (5YR 4/4) moist; massive; hard, firm, very sticky, very plastic; distinct clay films on rock fragments and prominent clay films on all faces of peds; 15 percent 75- to 250-millimeter fragments and 60 percent 2- to 75-millimeter fragments; abrupt wavy boundary.

2Cr—30 to 35 inches (76 to 90 centimeters); moderately cemented Catalina schist; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. Rock fragments cover 50 percent of the surface (15 percent cobbles, 30 percent channers, and 5 percent stones.) The particle-size control section averages 35 to 60 percent clay and 10 to 65 percent rock fragments.

The A1 and A2 horizons have dry color of 10YR 5/4 or 5/3; 7.5YR 6/4, 4/4, or 5/3; or 2.5Y 7/3. They have moist color of 10YR 4/4; 7.5YR 3/3, 3/2, or 2.5/2; or 2.5Y 4/2. The texture is sandy loam, very gravelly sandy loam, silt loam, gravelly silt loam, or very gravelly silt loam.

The 2Bt1 horizon has dry color of 10YR 5/2 or 3/3, 7.5YR 3/4, or 5YR 5/3 and moist color of 10YR 3/3, 7.5YR 3/3 or 3/2, or 5YR 3/3. The texture is clay loam, gravelly silt loam, or clay.

The 2Bt2 horizon has dry color of 10YR 3/2, 5YR 5/3, or 5Y 5/2 and moist color of 10YR 4/3 or 3/3, 7.5YR 3/3 or 3/2, or 5YR 3/3. The texture is silt loam, gravelly silty clay loam, sandy clay, clay loam, clay, or gravelly clay.

The 2Cr horizon consists of moderately cemented Catalina schist or green-hornblende gneiss or extremely weakly cemented chlorite-actinolite-talc mélange and quartz-muscovite gneissoid. The upper part of the 2Cr material commonly has fragments with clay films and could be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Nauti Series

The Nauti series consists of moderately deep, well drained soils that formed in material weathered from quartz-diorite rock (fig. 22). These soils are on the side slopes of interfluves on the hills and mountains of islands. Slopes range from 5 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

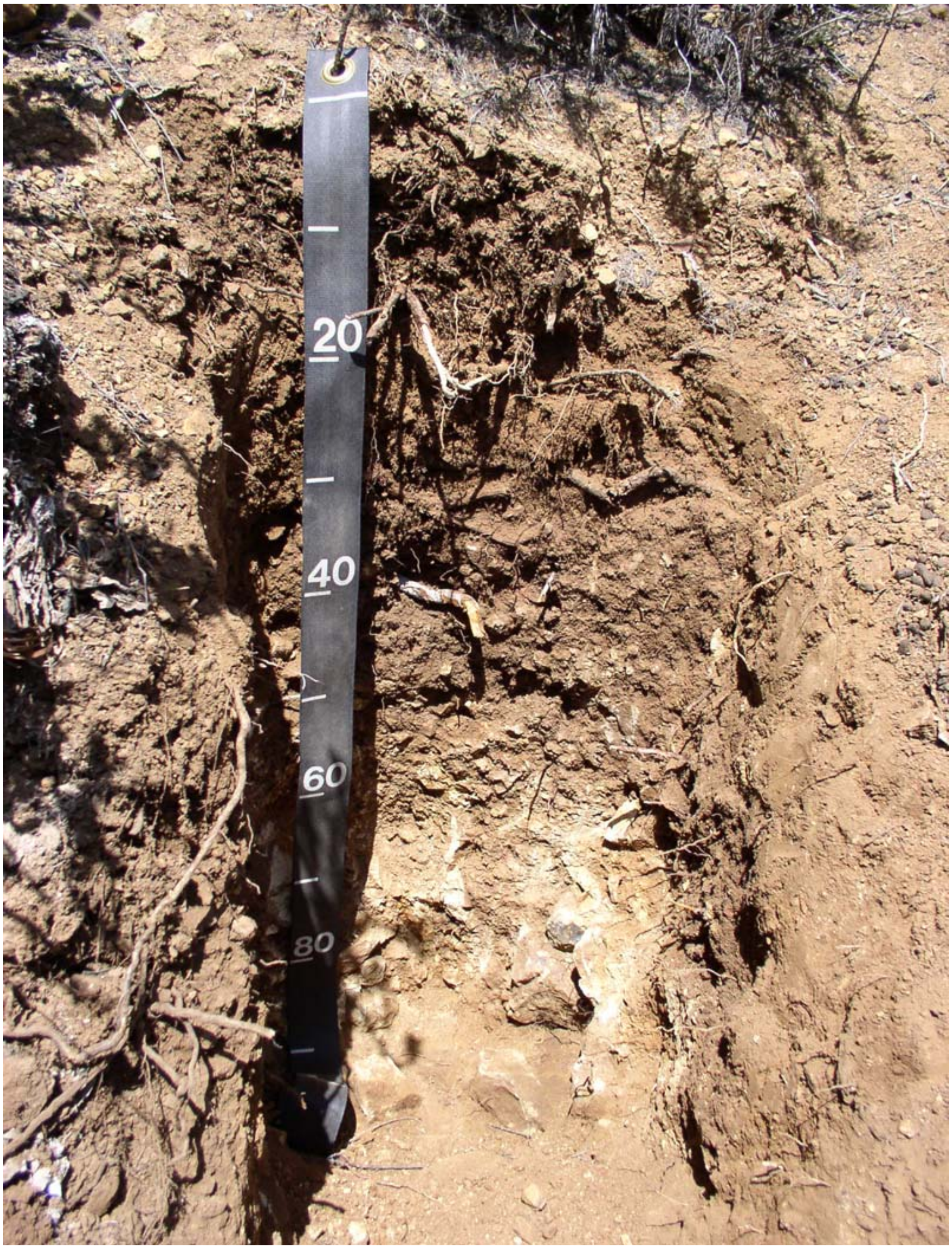

Figure 22.—Typical profile of Nauti soils, which support Island Coastal Sage Scrub and Chaparral. On the tape, depth is marked in centimeters.

Taxonomic classification: Fine-loamy, mixed, superactive, thermic Mollic Haploxeralfs

Typical pedon of Nauti loam, in an area of Oboship-Nauti-Bosun complex, 50 to 75 percent slopes, on a southeast-facing slope of 65 percent, under a cover of sage, lemonade bush, laurel, and grasses, at an elevation of 413 feet (126 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 19 minutes, 51 seconds north latitude and 118 degrees, 20 minutes, 40 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 2 inches (0 to 5 centimeters); brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few fine and common very fine roots; medium interstitial and coarse tubular pores; 5 percent 2- to 75-millimeter fragments; neutral, pH 6.9 by pH meter 1:1 water; clear wavy boundary.

Bt1—2 to 7 inches (5 to 18 centimeters); brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; moderately hard, friable, moderately sticky, moderately plastic; few fine and very fine roots; medium interstitial and coarse tubular pores; 90 percent continuous prominent clay films on all faces of peds and 90 percent discontinuous prominent clay films on surfaces along root channels; 5 percent 75- to 250-millimeter fragments and 15 percent 2- to 75-millimeter fragments; neutral, pH 7.3 by pH meter 1:1 water; clear wavy boundary.

Bt2—7 to 14 inches (18 to 35 centimeters); strong brown (7.5YR 5/6) cobbly clay, strong brown (7.5YR 4/6) moist; strong coarse subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine, fine, and medium roots; fine tubular pores; 80 percent continuous prominent clay films between sand grains and on all faces of peds; 10 percent 75- to 250-millimeter fragments and 20 percent 2- to 75-millimeter fragments; neutral, pH 7.3 by pH meter 1:1 water; gradual wavy boundary.

Bt3—14 to 31 inches (35 to 80 centimeters); light yellowish brown (10YR 6/4) gravelly clay loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; fine tubular and medium interstitial pores; 30 percent discontinuous distinct clay films on rock fragments and 40 percent discontinuous distinct clay films between sand grains; 2 percent 75- to 250-millimeter fragments and 15 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.4 by pH meter 1:1 water; diffuse wavy boundary.

Cr—31 to 35 inches (80 to 105 centimeters); hard, moderately cemented quartz-diorite porphyry; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 10YR 6/4, 5/4, 5/3, 4/3, or 4/2; 7.5YR 6/4; or 5YR 5/6. It has moist color of 10YR 4/6, 3/3, 3/2, or 2/2; 7.5YR 4/4, 4/3, or 3/2; or 5YR 4/6. The texture is sandy loam, loam, gravelly loam, or gravelly sandy loam. The content of rock fragments is 0 to 20 percent. The content of clay is 4 to 15 percent.

The Bt1 and Bt2 horizons have dry color of 10YR 3/2, 4/4, 5/3, 5/4, 5/6, 6/6, or 7/6; 7.5YR 4/3 or 4/6; or 5YR 5/6. They have moist color of 10YR 2/2, 3/2, 4/3, 4/4, or 5/4; 7.5YR 3/3, 3/6, 4/2, 4/4, 4/6, or 5/6; or 5YR 4/6. The texture is sandy loam, loam, gravelly loam, very gravelly loam, gravelly sandy loam, very gravelly sandy loam, sandy clay loam, gravelly or cobbly sandy clay loam, clay loam, or gravelly or cobbly clay loam. The content of rock fragments is 0 to 40 percent. The content of clay is 10 to 40 percent.

The Bt3 or BC horizon has dry color of 10YR 4/4 or 6/4, 7.5YR 5/6, 5YR 5/6, or 2.5Y 4/4 or 7/6 and moist color of 10YR 4/4 or 5/4, 5Y 4/2, 2.5Y 5/6, or 5YR 5/6. The texture is sandy loam, clay loam, extremely gravelly or cobbly clay loam, or very gravelly sandy loam. The content of rock fragments is 10 to 95 percent. The content of clay is 8 to 38 percent.

The Cr material consists of moderately cemented weakly cemented andesite fragments and can include lithic andesite with fractures more than 10 centimeters apart. The upper part of the Cr material commonly has fragments with clay films and could be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Nauti Series, Landscaped Phase

The Nauti series consists of moderately deep, well drained soils that formed in material weathered from quartz-diorite rock. These soils are on the side slopes of interfluves on the hills and mountains of islands. Slopes range from 5 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine-loamy, mixed, superactive, thermic Mollic Haploxeralfs

Typical pedon of Nauti loam, in an area of Nauti, landscaped-Urban land complex, 8 to 30 percent slopes, on an east-facing slope of 30 percent, in an area of bare ground and non-native ornamental shrubs, at an elevation of 137 feet (42 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 20 minutes, 40 seconds north latitude and 118 degrees, 19 minutes, 48 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Ap—0 to 4 inches (0 to 18 centimeters); brown (10YR 4/3) loam, dark brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine roots; medium interstitial and coarse tubular pores; 5 percent 2- to 75-millimeter fragments; neutral, pH 6.9 by pH meter 1:1 water; clear wavy boundary.

Bt1—4 to 8 inches (18 to 40 centimeters); brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; moderately hard, friable, moderately sticky, moderately plastic; few very fine roots; medium interstitial and coarse tubular pores; continuous prominent clay films on all faces of peds and discontinuous prominent clay films on surfaces along root channels; 5 percent 75- to 250-millimeter fragments and 15 percent 2- to 75-millimeter fragments; neutral, pH 7.3 by pH meter 1:1 water; clear wavy boundary.

Bt2—8 to 20 inches (40 to 60 centimeters); strong brown (7.5YR 5/6) gravelly clay, strong brown (7.5YR 4/6) moist; strong coarse subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine and medium roots; fine tubular pores; continuous prominent clay films on all faces of peds; 5 percent 75- to 250-millimeter fragments and 25 percent 2- to 75-millimeter fragments; neutral, pH 7.3 by pH meter 1:1 water; gradual wavy boundary.

Bt3—20 to 31 inches (60 to 75 centimeters); light yellowish brown (10YR 6/4) cobbly clay loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; few medium roots; fine tubular and medium interstitial pores; discontinuous distinct clay films between sand grains and on rock fragments; 10 percent 75- to 250-millimeter fragments and 15 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.4 by pH meter 1:1 water; diffuse wavy boundary.

Cr—31 to 35 inches (80 to 90 centimeters); moderately cemented bedrock; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 10YR 6/4, 5/4, 5/3, 4/3, or 4/2; 7.5YR 6/4; or 5YR 5/6. It has moist color of 10YR 4/6, 3/3, 3/2, or 2/2; 7.5YR 4/4, 4/3, or 3/2; or 5YR 4/6. The texture is sandy loam, loam, gravelly loam, or gravelly sandy loam. The content of rock fragments is 0 to 20 percent. The content of clay is 4 to 15 percent.

The Bt1 and Bt2 horizons have dry color of 10YR 3/2, 4/4, 5/3, 5/4, 5/6, 6/6, or 7/6; 7.5YR 4/3 or 4/6; or 5YR 5/6. They have moist color of 10YR 2/2, 3/2, 4/3, 4/4, or 5/4; 7.5YR 3/3, 3/6, 4/2, 4/4, 4/6, or 5/6; or 5YR 4/6. The texture is sandy loam, loam, gravelly loam, very gravelly loam, gravelly sandy loam, very gravelly sandy loam, sandy clay loam, gravelly or cobbly sandy clay loam, clay loam, or gravelly or cobbly clay loam. The content of rock fragments is 0 to 40 percent. The content of clay is 10 to 40 percent.

The Bt3 or BC horizon has dry color of 10YR 4/4 or 6/4, 7.5YR 5/6, 5YR 5/6, or 2.5Y 4/4 or 7/6 and moist color of 10YR 4/4 or 5/4, 5Y 4/2, 2.5Y 5/6, or 5YR 5/6. The texture is sandy loam, clay loam, extremely gravelly or cobbly clay loam, or very gravelly sandy loam. The content of rock fragments is 10 to 95 percent. The content of clay is 8 to 38 percent.

The Cr material consists of moderately cemented or weakly cemented andesite fragments and can include lithic andesite with fractures more than 10 centimeters apart. The upper part of the Cr material commonly has fragments with clay films and could be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Oboship Series

The Oboship series consists of deep, well drained soils that formed in material weathered from quartz-diorite rock (fig. 23). These soils are on the side slopes of interfluves on the dissected hills and mountains of islands. Slopes range from 15 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Coarse-loamy, mixed, superactive, isothermic Pachic Haplustolls

Typical pedon of Oboship gravelly loam, in an area of Oboship-Nauti-Bosun complex, 50 to 75 percent slopes, on a north-facing side slope of 65 percent, on a mountain interfluve at an elevation of 1,240 feet (378 meters), under a continuous stand of oaks, toyon, crossosoma, ceanothus, lemonade sumac, and laurel sumac; on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 19 minutes, 17 seconds north latitude and 118 degrees, 19 minutes, 25 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

Figure 23.—Typical profile of Oboship soils, which support Island Woodland and Chaparral. On the tape, depth is marked in centimeters.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch (0 to 3 centimeters); oak leaves and grasses; 36 percent rounded, 2- to 75-millimeter fragments; abrupt wavy boundary.

A—1 to 9 inches (3 to 24 centimeters); dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; strong coarse subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common fine and very fine roots;

common fine low-continuity interstitial and common very fine low-continuity tubular pores; 1 percent 75- to 250-millimeter fragments and 29 percent 2- to 75-millimeter fragments; moderately acid, pH 5.7 by pH meter 1:1 water; clear wavy boundary.

Bt1—9 to 22 inches (24 to 56 centimeters); dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium angular blocky structure; soft, very friable, slightly sticky, slightly plastic; common fine and medium roots; common fine and very fine low-continuity tubular pores; faint dark brown (7.5YR 3/3 moist) clay films on all faces of peds and 20 percent faint dark brown (7.5YR 3/3 moist) clay films on rock fragments; 1 percent 75- to 250-millimeter fragments and 29 percent 2- to 75-millimeter fragments; moderately acid, pH 5.7 by pH meter 1:1 water; gradual wavy boundary.

Bt2—22 to 33 inches (56 to 84 centimeters); light yellowish brown (10YR 6/4) gravelly loam, dark yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; common fine and very fine roots; common fine and very fine moderate-continuity tubular pores; distinct dark brown (7.5YR 3/3 moist) clay films on all faces of peds and 20 percent distinct dark brown (7.5YR 3/3 moist) clay films on rock fragments; 5 percent 75- to 250-millimeter fragments and 26 percent 2- to 75-millimeter fragments; slightly acid, pH 6.5 by pH meter 1:1 water; clear wavy boundary.

Bt3—33 to 60 inches (84 to 153 centimeters); light yellowish brown (10YR 6/4) extremely gravelly loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; slightly hard, firm, moderately sticky, moderately plastic; common very fine roots; 20 percent distinct dark brown (7.5YR 3/3 moist) clay films on rock fragments and 50 percent distinct dark brown (7.5YR 3/3 moist) clay films on all faces of peds; 20 percent 75- to 250-millimeter fragments and 65 percent 2- to 75-millimeter fragments; neutral, pH 6.7 by pH meter 1:1 water; diffuse irregular boundary.

R—60 inches (153 centimeters); very strongly cemented quartz-diorite porphyry bedrock; fractures more than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 63 degrees F (15 to 17 degrees C). The difference between mean summer and mean winter temperatures is 4 to 5 degrees C. The soil moisture control section is dry in all parts from about mid-June to mid-November (about 150 days) and is usually moist the rest of the year. The particle-size control section averages 15 to 18 percent clay. The Bt horizons have clay films and bridges, but they rarely have an increase in content of clay sufficient to meet the requirements for an argillic horizon. In some pedons the increase clay content is more than 3 percent from the overlying horizon.

The A horizon has dry color of 10YR 4/2, 3/3, 5/3, or 5/2 or 7.5YR 5/3 and moist color of 10YR 3/3, 3/2, or 2/2 or 7.5YR 2.5/2 or 3/3. The texture is loamy sand, sandy loam, gravelly loam, or loam. The content of rock fragments is 0 to 20 percent. Some pedons have an A2 horizon.

The Bt1 horizon has dry color of 10YR 4/2 or 3/2 or 7.5YR 4/4 and moist color of 10YR 3/3, 3/2, or 2/2 or 7.5YR 3/2. The texture is loam, gravelly loam, gravelly sandy loam, gravelly clay loam, or sandy clay loam. The content of rock fragments is 0 to 21 percent.

The Bt2 horizon has dry color of 10YR 6/4, 5/6, 5/4, or 4/3 or 7.5YR 4/4 and moist color of 10YR 4/4, 4/3, or 2/2 or 7.5YR 3/2. The texture is gravelly sandy loam, very gravelly loam, clay loam, gravelly clay loam, or sandy clay. The content of rock fragments is 0 to 35 percent.

The Bt3 horizon and the Bt4 horizon (where present) have dry color of 10YR 6/4, 5/4, or 4/6 and moist color of 10YR 4/3, 4/6, or 4/4. The texture is gravelly sandy clay loam, extremely gravelly clay loam, gravelly clay loam, or extremely gravelly loam. The content of rock fragments is 30 to 85 percent.

The C horizon (where present) dry color of 2.5Y and moist color of 10YR 4/6 or 4/4. The texture is loamy sand, sandy loam, gravelly loam, or loam. The content of rock fragments is 0 to 90 percent.

The R layer (lithic contact) consists of very rigid to hard and fractured quartz-diorite porphyry, diorite, and intrusions of andesite. The lithic contact has fractures more than 10 centimeters apart. In some pedons it is overlain by Cr material that consists of moderately cemented or weakly cemented quartz-diorite and andesite fragments. The upper part of the fractured Cr material commonly has fragments and could be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Pachic Argixerolls

Pachic Argixerolls in this survey area consist of moderately deep or deep, well drained soils that formed in slope alluvium and residuum derived from volcanic rock. These soils are on the side slopes of interfluves. Slopes range from 50 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Pachic Argixerolls

Example of a pedon of Pachic Argixerolls loam, in an area of Tongva-Pachic Argixerolls-Freeboard complex, 55 to 75 percent slopes, on a northwest-facing slope of 50 percent, under a cover of chaparral, at an elevation of 1,335 feet (407 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 25 seconds north latitude and 118 degrees, 22 minutes, 40 seconds west longitude; NAD8; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Pachic Argixerolls in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1—0 to 2 inches (0 to 5 centimeters); dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, slightly plastic; 10 percent rounded, 2- to 75-millimeter fragments; slightly acid, pH 6.5 by phenol red; abrupt wavy boundary.

A2—2 to 7 inches (5 to 18 centimeters); dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky, slightly plastic; 5 percent rounded, 75- to 250-millimeter fragments and 20 percent rounded, 2- to 75-millimeter fragments; slightly acid, pH 6.5 by phenol red; clear wavy boundary.

Bt1—7 to 16 inches (18 to 40 centimeters); dark grayish brown (10YR 4/2) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; 85 percent continuous distinct clay films between sand grains; 5 percent rounded, 75- to 250-millimeter fragments and 40 percent rounded, 2- to 75-millimeter fragments; neutral, pH 7.0 by phenol red; gradual wavy boundary.

Bt2—16 to 41 inches (40 to 105 centimeters); brown (10YR 4/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure;

moderately hard, friable, slightly sticky, slightly plastic; 40 percent continuous faint clay films between sand grains; 5 percent rounded, 75- to 250-millimeter fragments and 60 percent rounded, 2- to 75-millimeter fragments; neutral, pH 7.0 by phenol red; abrupt irregular boundary.

Cr—41 to 45 inches (105 to 115 centimeters); moderately cemented, mixed volcanic bedrock; fractures less than 10 centimeters apart.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The depth to bedrock is 39 to 41 inches (100 to 105 centimeters). The particle-size control section averages 18 to 22 percent clay and 43 to 56 percent rock fragments

The A horizon has dry color of 10YR 4/3 or 4/2. The texture is loamy sand, very gravelly sandy loam, gravelly loam, or loam.

The Bt horizons have dry color of 10YR 4/3 or 4/2. The texture is sandy loam, loam, gravelly loam, very gravelly sandy loam, very gravelly clay loam, or clay loam.

Purser Series

The Purser series consists of well drained soils that formed in residuum derived from andesite and volcanic rock. These soils are on the side slopes of interfluves on the hills and mountains of Catalina Island. Slopes range from 5 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Clayey, smectitic, thermic Lithic Haploxeralfs

Typical pedon of Purser clay loam, in an area of Purser-Luff complex, 15 to 35 percent slopes, on a west-facing slope of 35 percent, under a cover of annual grasses surrounded by lemonade sumac, scrub oaks, and toyon, at an elevation of 725 feet (221 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 26 minutes, 12.2 seconds north latitude and 118 degrees, 28 minutes, 36.7 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 2 inches (0 to 4 centimeters); brown (7.5YR 4/2) clay loam, dark brown (7.5YR 3/2) moist; 34 percent clay; strong medium granular and strong fine subangular blocky structure; slightly hard, friable, moderately sticky, moderate plastic; common very fine roots; common fine interstitial and common very fine tubular pores; continuous distinct clay films on all faces of peds; 3 percent rounded, 75- to 250-millimeter andesite fragments and 8 percent rounded, 2- to 75-millimeter andesite fragments; slightly acid, pH 6.5 by phenol red; abrupt wavy boundary.

Bt—2 to 15 inches (4 to 37 centimeters); very dark brown (7.5YR 2.5/2) clay, very dark brown (7.5YR 2.5/2) moist; 45 percent clay; strong fine subangular blocky and moderate medium prismatic structure; hard, firm, very sticky, very plastic; common fine and common very fine tubular pores; continuous prominent clay films on all faces of peds; neutral, pH 7.0 by phenol red; abrupt wavy boundary.

R—15 inches (37 to centimeters); very strongly cemented andesite; fractures more than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 10YR 5/3 or 4/2, 7.5YR 4/2, or 5YR 4/2 and moist color of 10YR 3/3 or 2/2, 7.5YR 3/2, or 5YR 2/2. The texture is gravelly loam or clay loam. The content of rock fragments is 0 to 25 percent.

The Bt horizon has dry color of 7.5YR 4/3, 3/2, or 2.5/2 or 5YR 5/3 and moist color of 7.5YR 3/2 or 2.5/2 or 5YR 3/3. The texture is gravelly clay loam or clay. The content of rock fragments is 0 to 15 percent.

The R layer is indurated to strongly cemented, angular, fractured bedrock.

Starbright Series

The Starbright series consists of deep, well drained soils that formed in residuum derived from andesite and volcanic rock. These soils are generally on north-facing side slopes and the lower parts of interfluves on hills and mountains. Slopes range from 10 to 65 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine, smectitic, isothermic Typic Argiustolls

Typical pedon of Starbright gravelly loam, in an area of Tongva-Freeboard-Starbright complex, 30 to 55 percent slopes, on a northeast-facing slope of 43 percent, under a cover of oaks, toyon, crossosoma, ceanothus, lemonade sumac, and laurel sumac, at an elevation of 1,240 feet (378 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 16.3 seconds north latitude and 118 degrees, 23 minutes, 0.7 second west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 3 inches (0 to 8 centimeters); slightly decomposed plant material; moderately acid, pH 5.8 by pH meter 1:1 water; abrupt smooth boundary.

A—3 to 8 inches (8 to 20 centimeters); very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; strong medium subangular blocky structure; soft, friable, nonsticky, nonplastic; common fine and very fine roots throughout; 1 percent 75- to 250-millimeter fragments and 20 percent 2- to 75-millimeter fragments; moderately acid, pH 5.8 by pH meter 1:1 water; clear wavy boundary.

Bt1—8 to 12 inches (20 to 30 centimeters); very dark grayish brown (10YR 3/2), loam, very dark brown (10YR 2/2) moist; 25 percent clay; strong medium subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; common fine and medium roots throughout; faint clay films on all faces of peds; 5 percent subangular, 2- to-75 millimeter fragments; slightly acid, pH 6.5 by pH meter 1:1 water; clear wavy boundary.

Bt2—12 to 16 inches (30 to 40 centimeters); very dark grayish brown (10YR 3/2) clay loam, very dark brown (10YR 2/2) moist; massive; hard, firm, very sticky, very plastic; common fine and medium roots throughout; prominent clay films on all faces of peds; 5 percent 2- to 75-millimeter fragments; neutral, pH 6.7 by pH meter 1:1 water; clear wavy boundary.

Bt3—16 to 28 inches (40 to 70 centimeters); very dark grayish brown (10YR 3/2) clay, very dark brown (10YR 2/2) moist; massive; very hard, firm, very sticky, very plastic; common fine and medium roots throughout; prominent clay films on rock fragments; 10 percent 2- to 75-millimeter fragments; neutral, pH 7.0 by pH meter 1:1 water; clear wavy boundary.

Bt4—28 to 33 inches (70 to 85 centimeters); brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; moderately hard, moderately sticky, moderately plastic; prominent clay films on all faces of peds and distinct clay films on rock fragments; 10 percent 2- to 75-millimeter fragments; neutral, pH 6.7 by pH meter 1:1 water; gradual wavy boundary.

Bt5—33 to 43 inches (85 to 110 centimeters); brown (10YR 4/3) (broken face) clay loam, dark brown (10YR 3/3) broken face and moist; 35 percent clay; weak fine subangular blocky structure; moderately hard, moderately sticky, moderately plastic; prominent clay films on rock fragments; 30 percent subangular, 75- to 250-millimeter andesite fragments and 65 percent subangular, 2- to 75-millimeter andesite fragments; neutral, pH 6.7 by pH meter 1:1 water; gradual wavy boundary.

Crt—43 to 53 inches (110 to 135 centimeters); 95 percent strongly cemented, extremely hard andesite; fractures less than 10 centimeters apart; distinct clay films on rock fragments.

Range in characteristics

The mean annual soil temperature is 59 to 63 degrees F (15 to 17 degrees C). The difference between mean summer and mean winter temperatures is 4 to 5 degrees C. The soil moisture control section is dry in all parts from about mid-June to mid-November (about 150 days) and is usually moist in some part the rest of the year.

The A horizon has dry color of 10YR 4/2, 3/2, or 2/2 or 7.5YR 4/2 and moist color of 10YR 2/2 or 7.5YR 2.5/2. The texture is gravelly loam, loam, or silty clay loam. The content of rock fragments is 5 to 20 percent. The content of clay is 8 to 25 percent.

The Bt1 horizon has dry color of 10YR 4/3, 4/2, or 3/2 or 7.5YR 3/2 and moist color of 10YR 3/2 or 2/2 or 7.5YR 2.5/2. The texture is loam, gravelly clay loam, or clay. The content of rock fragments generally is 5 to 15 percent. The content of clay is 25 to 50 percent.

The Bt2 and Bt3 horizons have dry color of 10YR 5/3 or 3/2 or 7.5YR 3/2 and moist color of 10YR 3/3 or 2/2 or 7.5YR 3/2. The texture is clay loam or clay. The content of rock fragments generally is 5 to 10 percent. The content of clay is 38 to 50 percent.

The Bt4 and Bt5 horizons are silty clay loam, clay loam, gravelly clay loam, extremely gravelly clay loam, clay, gravelly clay, or extremely gravelly clay. The content of rock fragments generally is 10 to 95 percent. The content of clay is 30 to 50 percent.

The Cr material consists of extremely weakly cemented to moderately cemented andesite fragments and can include lithic andesite with fractures more than 10 centimeters apart. The upper part of the fractured Cr material commonly has distinct clay films on rock fragments and in some pedons would be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Tongva Taxadjunct

The Tongva taxadjunct consists of moderately deep, well drained soils that formed in slope alluvium and residuum derived from andesite and volcanic rock. These soils are on the side slopes of interfluves on hills and mountains. Slopes range from 15 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine-loamy, mixed, superactive, thermic Typic Argixerolls

Typical pedon of Tongva loam, in an area of Tongva-Pachic Argixerolls-Freeboard complex, 55 to 75 percent slopes, on a southwest-facing slope of 70 percent, under a cover of annual grasses surrounded by lemonade sumac, scrub oak, and toyon, at an elevation of 600 feet (183 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 25 seconds north latitude and 118 degrees, 22 minutes, 30 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch (0 to 1 centimeter); slightly decomposed plant material; moderately acid, pH 6.0, by pH meter 1:1 water; abrupt smooth boundary.

A—1 to 4 inches (1 to 11 centimeters); dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; neutral, pH 6.6 by pH meter 1:1 water; clear wavy boundary.

Bt1—4 to 11 inches (11 to 29 centimeters); dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, moderately plastic; distinct clay films; 5 percent 2- to 75-millimeter fragments; neutral, pH 7.2 by pH meter 1:1 water; clear wavy boundary.

Bt2—11 to 21 inches (29 to 54 centimeters); brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; moderately hard, very friable, moderately sticky, moderately plastic; prominent clay films on rock fragments; 1 percent 2- to 75-millimeter fragments and 1 percent 75- to 250-millimeter fragments; slightly alkaline, pH 7.4 by pH meter 1:1 water; clear wavy boundary.

Bt3—21 to 26 inches (54 to 66 centimeters); light olive brown (2.5Y 5/3) sandy clay loam, olive brown (2.5Y 4/3) moist; moderate fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; prominent clay films on rock fragments; 15 percent 2- to 75-millimeter fragments and 5 percent 75- to 250-millimeter fragments; neutral, pH 7.0 by pH meter 1:1 water; clear wavy boundary.

Cr—26 to 28 inches (66 to 72 centimeters); moderately cemented bedrock; fractures less than 10 centimeters apart.

Range in characteristics

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soils are moist from mid or late November to late June or early July. The depth to paralithic bedrock is 20 to 40 inches (50 to 100 centimeters).

The A horizon has dry color of 10YR 5/2, 5/3, 4/2, 4/3, 3/2, or 3/1 or 7.5YR 4/4 and moist color of 10YR 3/3, 3/2, 2/2, or 2/1 or 7.5YR 3/2. The texture is loam or sandy loam. The content of rock fragments is 5 to 10 percent. The content of clay is 12 to 27 percent.

The Bt horizons have dry color of 10YR 5/2, 5/3, 4/2, or 4/3 or 7.5YR 5/2 and moist color of 10YR 3/3, 3/2, or 2/2 or 7.5YR 3/2 or 3/3. The texture is clay loam, loam, gravelly loam, or gravelly clay loam. The content of rock fragments is 5 to 30 percent. The content of clay is 18 to 35 percent.

The Cr material consists of extremely weakly cemented to moderately cemented andesite fragments and can include lithic andesite with fractures more than 10 centimeters apart. The upper part of the fractured Cr material commonly has distinct clay films on rock fragments and in some pedons would be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Typic Argixerolls

Typic Argixerolls in this survey area consist of very deep, well drained soils that formed in alluvium and residuum derived from quartz-diorite and volcanic and schist rocks. These soils are on the toeslopes of canyon bottoms and in drainageways adjacent to the footslopes of hills. Slopes range from 2 to 8 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Fine-loamy, mixed, thermic Typic Argixerolls

Example of a pedon of Typic Argixerolls gravelly loam, in an area of Typic Argixerolls-Calcic Haploxerolls-Urban land complex, 2 to 8 percent slopes, landscaped, on a northeast-facing slope of 4 percent, under a cover of coastal sage scrub, at an elevation of 131 feet (40 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 19 minutes, 59 seconds north latitude and 118 degrees, 20 minutes, 0.3 second west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Typic Argixerolls in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch (0 to 2 centimeters); slightly decomposed plant material; abrupt wavy boundary.

A—1 to 5 inches (2 to 12 centimeters); dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure parting to strong granular; slightly hard, very friable, nonsticky, nonplastic; common fine and very fine roots throughout; common fine interstitial pores; 5 percent 5- to 75-millimeter fragments and 15 percent 2- to 5-millimeter fragments; clear wavy boundary.

Bt—5 to 16 inches (12 to 40 centimeters); dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine prismatic structure parting to strong fine subangular blocky; moderately hard, friable, slightly sticky, slightly plastic; common fine and very fine roots throughout; 30 percent distinct very dark brown (10YR 2/2) clay films on all faces of peds and 30 percent distinct very dark brown (10YR 2/2) clay films between sand grains; 2 percent 75- to 250-millimeter fragments and 10 percent 2- to 75-millimeter fragments; clear wavy boundary.

2A—16 to 37 inches (40 to 95 centimeters); yellowish brown (10YR 5/6) gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, slightly sticky, slightly plastic; common fine and very fine roots throughout; common very fine interstitial pores; 5 percent 2- to 5-millimeter fragments and 15 percent 5- to 75-millimeter fragments; clear wavy boundary.

2Bt—37 to 63 inches (95 to 200 centimeters); yellowish brown (10YR 5/6) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; moderately hard, friable, moderately sticky, slightly plastic; 5 percent faint clay films between sand grains and 10 percent faint clay films on all faces of peds.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. Near Two Harbors, these soils resemble Luff or Masthead soils but show some evidence of an eolian surface layer. Some areas are regularly irrigated by sprinklers.

Typic Haploxeralfs

Typic Haploxeralfs in this survey area consist of shallow to deep, somewhat excessively drained soils that formed in colluvium over residuum derived from schist. These soils are on the side slopes of mountains. Slopes range from 45 to 75 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Loamy-skeletal, mixed, thermic Typic Haploxeralfs

Example of a pedon of Typic Haploxeralfs sandy loam, in an area of Masthead-Coastwise-Typic Haploxeralfs complex, 45 to 75 percent slopes, on an east-facing slope of 65 percent, under a cover of coastal sage scrub, at an elevation of 1,227 feet (374 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 26 minutes, 29 seconds north latitude and 118 degrees, 32 minutes, 44 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Typic Haploxeralfs in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch (0 to 1 centimeter); slightly decomposed organic material.

A1—1 to 2 inches (1 to 4 centimeters); yellowish brown (10YR 5/4) sandy loam, brown (10YR 4/3) moist; moderate medium platy structure; slightly hard, nonsticky, nonplastic; common very fine roots throughout.

A2—2 to 7 inches (4 to 17 centimeters); yellowish brown (10YR 5/4) gravelly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, nonsticky, nonplastic; common fine and very fine roots throughout; 20 percent 2- to 75-millimeter fragments.

Bw—7 to 15 inches (17 to 38 centimeters); yellowish brown (10YR 5/4) gravelly loam, dark brown (10YR 3/3) moist; massive; hard, loose, moderately sticky, slightly plastic; common fine and very fine roots throughout; 5 percent 75- to 250-millimeter fragments and 20 percent 2- to 75-millimeter fragments.

Bt—15 to 23 inches (38 to 58 centimeters); brown (7.5YR 4/4) very gravelly loam, dark brown (7.5YR 3/3) moist; massive; hard, loose, slightly sticky, slightly plastic; common very fine roots throughout; 40 percent faint clay films on rock fragments; 10 percent 75- to 250-millimeter fragments and 35 percent 2- to 75-millimeter fragments.

Cr—23 to 32 inches (58 to 83 centimeters); moderately cemented schist; fractures less than 10 centimeters apart.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The particle-size control section averages 14 to 30 percent clay and 38 to 45 percent rock fragments. The depth to bedrock is 35 to 120 centimeters. The bedrock ranges from moderately cemented schist with fractures less than 10 centimeters apart to indurated schist with fractures more than 10 centimeters apart. Rock fragments cover 25 to 70 percent of the surface.

The A horizon has dry color of 10YR 5/4 or 7.5YR 4/4 or 6/4 and moist color of 10YR 4/3 or 7.5YR 4/4 or 3/4. The texture is sandy loam or silt loam. The content of rock fragments is 15 to 45 percent. The content of clay is 8 to 9 percent.

The Bt horizon has dry color of 7.5YR 4/4 or 6/4, 10YR 5/6, or 2.5Y 5/3 and moist color of 2.5YR 4/4 or 4/3, 5YR 5/4, 7.5YR 3/3 or 4/6, or 10YR 4/4. The texture is loam or clay loam. The content of rock fragments is 21 to 60 percent. The content of clay is 15 to 35 percent.

The Cr horizon consists of moderately cemented Catalina schist or green-hornblende gneiss or extremely weakly cemented chlorite-actinolite-talc mélange and quartz-muscovite gneissoid. The upper part of the Cr material commonly has fragments with clay films and could be described as fragmental. This feature should be considered when such properties as AWC are evaluated.

Typic Haploxerepts

Typic Haploxerepts in this survey area consist of very deep, well drained soils that formed in alluvium derived from andesite and schist. These soils are on alluvial flats and fans at the bottom of large drainageways. Slopes range from 2 to 5 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Typic Haploxerepts

Example of a pedon of Typic Haploxerepts very gravelly sand, in an area of Typic Haploxerepts-Xerofluvents-Argixerolls, 0 to 8 percent slopes, on a northeast-facing slope of 5 percent, under a cover of mule fat and annual grasses, at an elevation of 99 feet (28 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 19.3 seconds north latitude and 118 degrees, 21 minutes, 30.9 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Typic Haploxerepts in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 2 inches (0 to 5 centimeters); slightly decomposed plant material; clear wavy boundary.

A—2 to 8 inches (5 to 20 centimeters); yellowish brown (10YR 5/4) very gravelly sand, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots throughout; common very fine interstitial pores; 10 percent moderately cemented, 75- to 250-millimeter fragments and 35 percent moderately cemented, 5- to 75-millimeter fragments; slightly acid, pH 6.5 by phenol red; clear wavy boundary.

C—8 to 31 inches (20 to 80 centimeters); yellowish brown (10YR 5/4) very gravelly sand, dark yellowish brown (10YR 3/4) moist; massive; loose, very friable, nonsticky, nonplastic; common very fine roots throughout; many very fine interstitial pores; 5 percent moderately cemented, 75- to 250-millimeter fragments and 30 percent moderately cemented, 5- to 75-millimeter fragments; neutral, pH 6.8 by phenol red; clear wavy boundary.

2Bw—31 to 65 inches (80 to 165 centimeters); brown (10YR 5/3) extremely gravelly loamy sand, dark brown (10YR3/3) moist; weak medium subangular blockys tructure; soft, very friable, nonsticky, nonplastic; few fine and very fine roots throughout; few fine and common very fine interstitial pores; 3 percent moderately cemented, 250- to 600-millimeter andesite fragments, 10 percent moderately cemented, 75- to 250-millimeter fragments, and 55 percent moderately cemented, 5- to 75-millimeter andesite fragments; neutral, pH 7.0 by phenol red; abrupt wavy boundary.

3Ab1—65 to 75 inches (165 to 190 centimeters); dark grayish brown (10YR 4/2) loam, very dark brown (10YR2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; 20 percent discontinuous faint clay films on surfaces along pores; neutral, pH 6.8 by phenol red; abrupt wavy boundary.

4Ab2—75 to 83 inches (190 to 210 centimeters); dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; 20 percent discontinuous faint clay films on surfaces along pores; 1 percent moderately cemented, 250- to 600-millimeter andesite fragments, 10 percent moderately cemented, 75- to 250-millimeter andesite fragments, and 45 percent moderately cemented, 5- to 75-millimeter andesite fragments; neutral, pH 6.8 by phenol red.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The particle-size control section averages 4 to 14 percent clay and 10 to 73 percent rock fragments. Rock fragments cover 5 to 30 percent of the surface.

The A horizon has dry color of 10YR 5/4 or 5/3 and moist color of 10YR 3/4 or 3/2. The texture is loam or very gravelly sand. The content of rock fragments (moderately cemented to indurated fragments of schist and andesite) is 0 to 45 percent. The content of clay is 4 to 12 percent.

The C horizon has dry color of 10YR 5/4 or 4/2 and moist color of 10YR 3/4 or 3/2. The texture is very gravelly sand or gravelly sandy loam. The content of rock fragments (moderately cemented to indurated fragments of schist and andesite) is 18 to 35 percent. The content of clay is 4 to 14 percent.

The 2Bw horizon has dry color of 10YR 5/3 or 5/2 and moist color of 10YR 3/3 or 3/2. The texture is very gravelly or extremely gravelly loamy sand. The content of rock fragments (moderately cemented to indurated fragments of schist and andesite) is 55 to 70 percent.

The 3Ab horizon has dry color of 10YR 4/3 or 4/2 and moist color of 10YR 3/2 or 2/2. The texture is loam or extremely gravelly loamy sand. The content of rock fragments (moderately cemented to indurated fragments of schist and andesite) is 0 to 65 percent. The content of clay is 4 to 20 percent.

The 4Ab horizon has dry color of 10YR 4/3 or 4/2 and moist color of 10YR 3/2 or 2/2. The texture is very gravelly loam or very gravelly clay loam. The content of rock fragments (moderately cemented to indurated fragments of schist and andesite) is 40 to 55 percent. The content of clay is 20 to 28 percent.

Typic Xerofluvents

Typic Xerofluvents in this survey area consist of very deep, somewhat excessively drained soils that formed in alluvium derived from metamorphic and volcanic rocks. These soils are on stream terraces, in river valleys, and on flood plains. Slopes range from 0 to 8 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Typic Xerofluvents

Example of a pedon of Typic Xerofluvents, in an area Typic Xerofluvents-Riverwash complex, 0 to 8 percent slopes, under a cover of mulefat, at an elevation of 94 feet (29 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 22 minutes, 23 seconds north latitude and 118 degrees, 21 minutes, 26 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Typic Xerofluvents in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 2 inches (0 to 5 centimeters); slightly decomposed plant material; 5 percent strongly cemented, 2- to 75-millimeter, mixed rock fragments; abrupt smooth boundary.

A—2 to 24 inches (5 to 60 centimeters); yellowish brown (10YR 5/4) (broken face) sandy loam, dark yellowish brown (10YR 3/4) broken face and moist; 4 percent clay; weak coarse subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; common very fine interstitial pores; 5 percent strongly cemented, 2- to 75-millimeter, mixed rock fragments and 5 percent strongly cemented, 75- to 250-millimeter, mixed rock fragments; neutral, pH 6.8 by pH meter 1:1 water; clear wavy boundary.

2C1—24 to 39 inches (60 to 99 centimeters); yellowish brown (10YR 5/4) (broken face) very gravelly sand, dark yellowish brown (10YR 3/4) broken face and moist; 5 percent clay; massive; soft, nonsticky, nonplastic; few very fine roots; common fine interstitial and common medium interstitial pores; 8 percent strongly cemented, 75- to 250-millimeter, mixed rock fragments and 45 percent strongly cemented, 2- to 75-millimeter, mixed rock fragments; neutral, pH 7.0 by pH meter 1:1 water; abrupt smooth boundary.

3C2—39 to 79 inches (99 to 200 centimeters); yellowish brown (10YR 5/4) (broken face) very gravelly sand, dark yellowish brown (10YR 3/4) broken face and moist; 6 percent clay; single grain; loose, nonsticky, nonplastic; 1 percent strongly cemented, 250- to 600-millimeter, mixed rock fragments, 15 percent strongly cemented, 75- to 250-millimeter, mixed rock fragments, and 45 percent strongly cemented, 2- to 75-millimeter, mixed rock fragments; neutral, pH 7.2 by pH meter 1:1 water.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year. The particle-size control section averages 2 to 10 percent clay and 35 to 75 percent rock fragments.

The A horizon has dry color of 10YR 6/2, 6/3, 5/3, 5/4, or 4/4 and moist color of 10YR 4/2, 4/3, 3/2, 3/3, or 3/4. The texture is sandy loam, sand, or loamy sand. The content of rock fragments is 0 to 15 percent.

The 2C and 3C horizons have dry color of 10YR 6/2, 6/3, 5/3, 5/4, or 4/4 and moist color of 10YR 4/2, 4/3, 3/2, 3/3, or 3/4. The texture is sand, gravelly to extremely gravelly sand, or sandy loam. The content of rock fragments is 0 to 85 percent.

Typic Xerorthents, Fill Phase

Typic Xerorthents, fill, in this survey area consist of very deep, excessively drained soils that formed in graded fill derived from Catalina schist and serpentine rock. These soils are in the human-made highland area known as “Airport in the Sky.” Slopes range from 0 to 70 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Typic Xerorthents

Example of a pedon of Typic Xerorthents, fill, in an area of Typic Xerorthents, fill-Typic Xerorthents, steep fill, association, 0 to 70 percent slopes, on a bare north-facing slope of 1 percent, at an elevation of 1,580 feet (482 meters); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 24 minutes, 16 seconds north latitude and 118 degrees, 25 minutes, 7 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Typic Xerorthents, fill, in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A—0 to 4 inches (0 to 11 centimeters); light olive brown (2.5Y 5/3) gravelly silt loam, very dark grayish brown (2.5Y 3/2) moist; strong medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; common very fine roots; continuous faint light brown (7.5YR 6/4 dry) silt coatings on all faces of peds and on surfaces along pores; 5 percent 2- to 75-millimeter fragments; neutral, pH 7.0 by phenol red; abrupt wavy boundary.

C1—4 to 61 inches (11 to 155 centimeters); light yellowish brown (2.5Y 6/4) very gravelly silt loam, olive brown (2.5Y 4/4) moist; strong medium angular blocky structure; loose, very friable, slightly sticky, slightly plastic; common very fine roots; 5 percent 75- to 250-millimeter fragments and 35 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.4 by phenol red; gradual wavy boundary.

C2—61 to 79 inches (155 to 200 centimeters); light yellowish brown (2.5Y 6/4) very gravelly silt loam, olive brown (2.5Y 4/4) moist; 10 percent clay; strong medium angular blocky structure; loose, very friable, slightly sticky, slightly plastic; common very fine roots; 10 percent 75- to 250-millimeter fragments and 30 percent 2- to 75-millimeter fragments; slightly alkaline, pH 7.4 by phenol red.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped. This pedon represents both of the Typic Xerorthents components in map unit 456.

The mean annual soil temperature is 59 to 70 degrees F (15 to 21 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A horizon has dry color of 2.5Y 3/3 or 5/3 and has light brown (7.5YR 6/4) silt coatings. It has moist color of 2.5Y 3/2. The texture is gravelly silt loam or silt loam. The content of rock fragments is 5 to 30 percent.

The C horizons have dry color of 2.5Y 6/4 and moist color of 2.5Y 4/4. The texture is gravelly silt loam, very gravelly silt loam, or very gravelly loam. The content of rock fragments is 3 to 40 percent.

Xerorthents, Landscaped

Xerorthents, landscaped, in this survey area consist of very deep, somewhat excessively drained soils that formed in fill and natural alluvium derived from quartz-diorite. These soils are on alluvial flats. Slopes range from 0 to 8 percent. The mean annual precipitation is about 12 inches (305 millimeters), and the mean annual air temperature is about 63 degrees F (17 degrees C).

Taxonomic classification: Xerorthents

Example of a pedon of Xerorthents, landscaped, in an area Urban land-Xerorthents, landscaped, association, 0 to 8 percent slopes, on a north-facing slope of 4 percent, under a cover of non-native herbaceous plants and bermudagrass, at an elevation of 17 meters (5.5 feet); on Santa Catalina Island, Los Angeles County, California, in the soil survey area of the Channel Islands; 33 degrees, 18 minutes, 23 seconds north latitude and 118 degrees, 19 minutes, 37 seconds west longitude; NAD83; USGS quadrangle: Santa Catalina Island East.

The pedon that follows is representative of the Xerorthents in this survey area. Because of the high variability of the soils, however, the pedon is not completely typical. The pedon is located between San Clemente Street and the residence structures on an anthropogenic fill of alluvial material from Avalon Canyon.

When described, the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1—0 to 2 inches (0 to 6 centimeters); grayish brown (10YR 5/2) (broken face) sandy loam, very dark grayish brown (10YR 3/2) broken face and moist; 18 percent clay; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; few medium and common very fine roots; slightly acid, pH 6.2 by phenol red; very abrupt smooth boundary.

2A2—2 to 12 inches (6 to 30 centimeters); brown (10YR 5/3) (broken face) loam, dark brown (10YR 3/3) broken face and moist; 25 percent clay; massive; slightly hard, friable, slightly sticky, moderately plastic; few medium and few very fine roots; 14 percent angular, 2- to 75-millimeter fragments; neutral, pH 7.0 by phenol red; abrupt irregular boundary.

3C1—12 to 59 inches (30 to 150 centimeters); dark grayish brown (10YR 4/2) (broken face) clay loam, very dark grayish brown (10YR 3/2) broken face and moist; 30 percent clay; massive; moderately hard, friable, slightly sticky, moderately plastic; 14 percent angular, 2- to 75-millimeter fragments; neutral, pH 6.9 by phenol red; abrupt irregular boundary.

4C2—59 to 79 inches (150 to 200 centimeters); brownish yellow (10YR 6/6) (broken face) loamy sand, light yellowish brown (10YR 6/4) broken face and moist; 10 percent clay; massive; loose, very friable, nonsticky, nonplastic; neutral, pH 7.2 by phenol red.

Range in characteristics

These soils occur at a taxonomic level higher than the series because of the variability of the landscape at the scale mapped.

The mean annual soil temperature is 59 to 66 degrees F (15 to 19 degrees C). The soil moisture control section is dry in all parts from about mid-June to mid-November and is usually moist the rest of the year.

The A and 2A horizons have dry color of 2.5Y 3/3 or 5/3 or 10YR 5/2 or 5/3 and moist color of 2.5Y 3/2 or 10YR 3/2 or 3/3. The texture is sandy loam or loam. The content of rock fragments is 0 to 15 percent.

The 3C and 4C horizons have dry color of 10YR 6/6 or 4/2 and moist color of 2.5Y 4/4 or 10YR 3/2 or 6/4. The texture is loamy sand to clay loam. The content of rock fragments is 0 to 15 percent.

Formation of the Soils

Soil is generally defined as a natural growing medium for plants and habitat for soil animals and micro-organisms. Soil is a three-dimensional body and is made up of organic and mineral material and air and water. The characteristics and properties of soil are determined by physical and chemical processes that result from the interaction of five soil-forming factors. These factors are:

1. Climate, mainly the temperature and the kind and amount of precipitation since the accumulation or exposure of the parent material;
2. Living organisms, mainly the plant cover and the organisms living in and on the soil (including humans);
3. The amount of time during which the soil-forming factors have been operating;
4. Parent material, including its mineralogical and chemical composition and its texture and structure;
5. Topography, mainly as it affects internal and external soil properties, such as drainage, aeration, susceptibility to erosion, and exposure to the sun and wind (Jenny, 1941).

The influence of any one of these factors varies at each locality, and the soils may differ accordingly from place to place or within short distances.

Soils are classified, mapped, and interpreted on the basis of field verification of various kinds of soil horizons and their arrangement. This process often follows preliminary delineation of soil map units based on landforms, predicted soil characteristics, and knowledge of the area gained by the soil scientists involved in soil mapping. The degree and expression of the soil horizons reflect the extent of the interaction of soil-forming factors with one or more soil-forming processes, including additions, removals, transfers, and transformations (Simonson, 1959). Important diagnostic surface horizons in this survey area include mollic and ochric epipedons, and some of the significant diagnostic subsurface horizons include cambic and argillic horizons.

Climate

This survey area has a Mediterranean climate that is characterized by hot, dry summers and cool, moist winters. Fog is common all year. Most of the rainfall occurs in the period from October through April. Warm temperatures and moist soil conditions in spring are conducive to rapid chemical reactions. During periods of rainfall, water carrying dissolved or suspended solids moves through the soils. Weathering is generally limited in the cool winter months, but leaching processes become active with the onset of seasonal rainfall. Weathering is most active in spring and least active in summer and late fall.

The growth of plants, such as grasses, on the hills and mountains in the survey area is rapid early in spring but ceases in June or July because of a lack of moisture in conjunction with increased air temperature. The local climate of the southwestern United States also creates wind patterns that are a source of completely different parent material than what the island is directly composed of. The introduction, by wind, of alien geologic material creates soil formation of very rare and endemic soils on Santa Catalina and the other Channel Islands.

Fog occurs throughout the survey area during the entire year. Some areas have more fog than others. Fog is a crucial component of the climate factor in soil formation. The fog blocks radiant UV heat, and generally when fog is present the air is stable and wind is absent. These factors inhibit evapotranspiration and the loss of moisture stored in the soil. Air temperature fluxes are moderated by an increase in relative humidity, which brings added moisture to be collected by contact with parts of plants and other obstacles, such as fence posts, signs, and buildings. Fog may help to protect organic matter oxidation on the soil surface, but it also adds ambient moisture, which may help to support the rate of microbial degradation.

Local topography and relief affect climate variations. Although these are not major factors on Catalina Island, as elevation increases, temperature generally decreases and precipitation generally increases. As the amount of precipitation increases, the extent of leaching and the amount of vegetation also typically increase, resulting in an increased content of organic matter and the cycling of bases. Fluctuations in temperature and moisture affect the rate of organic-matter decomposition and accumulation and the weathering of minerals. Due to the relatively low change in elevation from sea level to Mount Orizaba, the differences in temperature and moisture on Catalina Island are not very significant. The range in temperatures occurs on a scale measurable enough to create different soil temperature regime classifications related mainly to aspect and micro topographic influences and vegetative canopy cover. These micro climate ranges affect the content of organic matter and the living organisms in the soil.

Living Organisms

The activities of living organisms, including soil flora, fauna, and humans, all influence the formation and morphology of soils. Fungi help to decompose organic matter into secondary metabolites. Some bacteria convert unavailable nitrogen gas from the soil atmosphere into forms that are available to plants. Bacteria, earthworms, small insects, and rodents mix soil material through burrowing and tunneling. Abandoned tunnels commonly are filled with loose material from the overlying horizons and transmit water more readily than the surrounding undisturbed soil material. Ungulates can change plant communities; increase compaction, runoff, and erosion; and ultimately alter hydrology and water quality.

Vegetation in the survey area has helped to stabilize the land surfaces. This stability has allowed the other soil-forming factors to influence the soils. Vegetation improves stability by protecting the surface against erosion. Also, plant roots help to develop soil structure and promote aggregate stability.

Sage, oak, and grass communities dominate the survey area. In some areas the deposition of organic matter from the plants is greater than the decomposition by micro-organisms, resulting in a thick, dark surface layer called a mollic epipedon. Sometimes this color is confused with dark colors originating from the parent rock itself. Soils on southern slopes with heavy sun exposure lose moisture more readily than other soils. In these areas, there are fewer different types of plants and the individual plants are smaller. The subsequent loss of shade exposes organic material to a higher rate of oxidation, resulting in less nutrient cycling and less soil stability.

Invasive, non-native plants also can alter soil chemistry. These changes can occur by the uptake of an abnormal ratio of nutrients or metals and by the deposit of organic allelopathic compounds produced by the plant. These processes can upset the native populations of micro-organisms or plants. Fennel, a perennial herb native to southern Europe, arrived on the northern Channel Islands in the late 1800s and has since invaded many plant communities on Santa Catalina. Fennel plants move into areas of disturbed soils, grow quickly to as much as 9 feet in height, and establish dense, uniform stands that block out native plants and can reduce native wildlife habitat. Flax brome and eucalyptus are potent fuels for fire and can increase the amount of bare soil exposed to erosion after a fire. These changes in plants alter the organic composition, moisture content, hydrology, and pH of the soils. Island-wide measures are taken annually as part of a comprehensive plan to control extremely detrimental invasive plants.

Time

Time is expressed through soil characteristics displayed in soil horizons. Young soils, such as Express and Flyer soils on hills and mountains where material is lost downslope faster than weathered clays can migrate through the soil, have few distinctive characteristics and few or no diagnostic subsurface horizons. Other soils, such as Masthead, Dewpoint, and Luff soils, have a prominent argillic horizon and are on older landform surfaces. These soils have had the time to develop distinctive profile characteristics.

Parent Material

The majority of Santa Catalina Island consists of an uplifted portion of metamorphic rock that was formed over 200 million years ago (Jurassic period). When the subduction zone on the western coast of North America and Central America was moving much faster than today, it created intense heat and molten rock. This heat and pressure transformed surrounding rock and ocean deposits into the metamorphic rock complex that makes up most of the basement material of the southern California inner borderland. Blueschist, greenschist, amphibolite, and serpentinite are the dominant rocks of this formation.

At the end of the Cretaceous period (65 MaBP), the rate of subduction and uplift slowed. Thereafter, about 40 million years of erosion outpaced any major uplift. The metamorphic province that now includes Santa Catalina was a highland area that contributed much of the silt and sandstones that are found across the other islands and along the California coast.

The transform fault system of the California borderland began about 30 million years ago (Oligocene period). When the tectonic plates changed from prevailing head-on convergence to the lateral motion now paralleling the coast, faults began to break up and create all sorts of land repositioning. As the sea floor spread apart, another period of volcanism began during the Miocene period from about 23 million to 5 million years ago. Apparently the portion of Catalina now exposed was submerged under the ocean during the Miocene Epoch. Evidence of subaqueous extrusion of andesite sits adjacent to a large pluton of quartz diorite on the east end of the island. The island has experienced alternating sea levels since that time.

Santa Catalina Island is divided into two major geologic provinces. The area from the eastern end to the western slopes of Black Jack Mountain and Mount Orizaba is made up of igneous rock. This younger rock sits on top of the basement metamorphic formation from the southern tip near Salta Verde Point to the western end. This basement rock is the metasedimentary mélange of schist (blueschist and greenschist), amphibolite and serpentinite, hornblende gneiss, muscovite, and talc, also referred to as the Franciscan Formation. Dewpoint, Masthead, and Coastwise soils are typical soils in this province.

The igneous rock is further divided into adjacent extrusive and intrusive provinces. From east of Avalon to Thompson Reservoir, quartz diorite is diked with an augite-hypersthene andesite. The soils in this area include Express, Flyer, Bosun, Oboship, and Marpol soils. Andesite is the adjacent extrusive material to the west, including

Mount Banning, Mount Orizaba, and Black Jack Mountain. Typical soils in this area include Freeboard, Starbright, Luff, and Purser soils and the Tongva taxadjunct.

These igneous and metamorphic rock types weather at significantly different rates. They also weather into different types of clay minerals and contain different ratios of cations.

A very important addition to the soil formation of Santa Catalina is the addition of eolian parent material from the mainland deserts. These particulate transfers from the mainland over the eastern Pacific Ocean are well documented (Muhs and others, 2007; Muhs and others, 2008). Recent (less than 5,000 years ago) additions of soil material are attributed to eolian deposition of particles originating in the Mojave Desert of California. These particles are less than 0.5 micron in size, or medium and finer silt. Sources are generally most abundant in the atmosphere during seasonal northeast Santa Ana winds. These deposits then become potential local sources of PM-10. Once these deposits of fine soil material are disturbed on Santa Catalina, the soil profile is significantly altered.

Development of the current landscape took place during the Late Pleistocene and Holocene Epochs. The more highly developed soils occur on stable landforms. The soils on hills and mountains in the survey area have material that began weathering during the Late Pleistocene. They commonly have a clayey argillic horizon or a cambic horizon and a mollic epipedon. The depth of the soils varies, depending on the weatherability of the parent material. The volcanic soils, such as Purser soils, are shallow mainly because the bedrock weathers slowly. The schist soils tend to be a bit deeper because they weather faster.

Topography and Landforms

The overall landscape of the survey area, mainly hills and mountains, is the result of erosional and constructional processes. These processes occurred in response to changes in climate, fluctuating sea levels, variable weather rates of the parent rock, and tectonic activities. Cyclic periods of landform stability and instability have occurred.

Determining the exact age of most of the soils in the survey area is difficult. The age of soils also can be estimated from the age of the geomorphic surface. Buried paleosols or exhumed paleosols can occur on the younger surfaces (Davis, 2004).

The youngest geomorphic surfaces in the survey area are the flood plains, stream terraces, and river valleys associated with the major streams. Typic Xerofluvents and Haploxerepts are typical soils on these landforms. These soils show little or no evidence of a cambic horizon. The present and Holocene-age Argixerolls and Typic Haploxeralfs on the hills and mountains on the east end of the island show limited evidence of an argillic horizon.

Different aspects have unique plant communities and associated soils that are readily recognized. Generally, the soils on north aspects have an isothermic soil temperature regime. The isothermic regime also occurs on southern slopes where there is sufficient vegetative cover to shade the surface. Soils on all aspects that do not have sufficient cover to provide shade are thermic. Evidence supporting these conclusions was documented at the NRCS soil temperature and soil moisture data-gathering sites on Santa Catalina Island and Santa Cruz Island.

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Glossary

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.

Ablation till. A general term for loose, relatively permeable material deposited during the downwasting of nearly static glacial ice. The material is either contained within the glacier or accumulated on the surface of the glacier.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. See Alluvial fan.

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.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

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.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is sometimes called a wash. It usually is dry, but it can be transformed into a temporary watercourse or short-lived torrent after a period of heavy rain in the watershed. Where it intersects an area of ground-water discharge, it is more properly classified as an intermittent stream channel.

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.

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.

Bajada. A broad, gently inclined piedmont slope extending from the base of a mountain range out into a basin. It is formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile parallel to the mountain front, resulting from the convexness of the component fans. The term generally refers to the constructional slopes of intermontane basins.

Bar (coast). A generic term for any of the various elongated offshore ridges, banks, or mounds of sand, gravel, or other unconsolidated material submerged at least at high tide and built up by the action of waves or currents, especially at the mouth of a river or estuary or offshore a short distance from the beach.

Bar (microfeature). A small, sinuous or arcuate, ridgelike lineation separated from others similar to it by small channels. It is caused by fluvial processes and is common on flood plains and young alluvial terraces. It is a constituent of bar and channel topography.

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.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

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.

Batholith. A large body of igneous intrusive (plutonic) rock, commonly regional in extent, such as the Sierra Nevada batholith.

Beach terrace. A landform that consists of a wave-cut scarp and wave-built terrace of well-sorted marine and lacustrine sand and gravel. Colloquially, in the western United States, relict shoreline from pluvial lakes, generally restricted to valley sides.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. A general term for the solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bolson. An internally drained (closed) intermontane basin into which drainageways from surrounding mountains converge inward toward a central depression.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Bulk density. A measurement of the ovendry 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.

Butte. An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs. It is characterized by a summit width that is less than the height of bounding escarpments, is commonly topped by a cap of resistant rock, and represents an erosional remnant carved from flat-lying rock.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Calcic horizon. A mineral soil horizon of secondary carbonate enrichment that is more than 15 centimeters thick, has a calcium carbonate equivalent of more than 15 percent, and has a calcium carbonate equivalent at least 5 percent higher than the underlying horizon.

Calcium carbonate equivalent. The amount of calcium carbonate in a soil measured by treating the soil sample with hydrochloric acid (HCl). The evolved carbon dioxide (CO_2) is measured, and the amount of carbonate is then calculated as calcium carbonate ($CaCO_3$).

Caliche. A general term for a prominent zone of secondary carbonate accumulation in surficial material of warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Fine crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) material. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other cementing minerals (carbonates, silicate, and sulfate) may be present. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

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.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence of soils on a landscape that are about the same age and formed in similar kinds of parent material under similar climatic conditions but have different characteristics as a result of differences in relief and drainage.

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.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil. (See Terracette.)

CEC. See Cation-exchange capacity.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cinders. Uncemented vitric, vesicular, pyroclastic material more than 2 millimeters in at least one dimension with apparent specific gravity (including vesicles) of more than 1 and less than 2.

Cirque. A semicircular, concave, bowllike area that has steep faces primarily resulting from the erosiveness of a mountain glacier.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clayey. 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.

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.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. See Cryoturbation.

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.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coppice dune. A small dune of fine grained soil material stabilized around shrubs or small trees.

Coprogenous earth (sedimentary peat). A type of limnic layer composed of fecal material from aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbation. A collective term used to describe all soil movement as a result of frost action, including the folding, breaking, and dislocating of beds and lenses of unconsolidated material.

Cuesta. An asymmetric, homoclinal ridge capped by resistant rock layers of slight or moderate dip (less than 10 degrees, or 16 percent). It is produced by differential erosion of interbedded resistant and weak rocks. A long, gently sloping to sloping face (dip slope), roughly paralleling the inclined beds, opposes a relatively short, steep face (scarp) cut across the tilted rocks.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

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.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

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.

Desert pavement. A natural, residual concentration of wind-polished, closely packed gravel, boulders, and other rock fragments that mantle a desert surface where wind action and sheetwash have removed the smaller particles. It commonly protects the underlying finer grained material from further deflation. The coarse fragments commonly are cemented with mineral material.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedded rock (for example, the long, gently inclined surface of a cuesta).

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

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.

Draw. A small stream channel that generally is more open and has a broader floor than a ravine or gulch.

Drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till that may or may not have a core of bedrock or stratified drift. The longer axis is parallel to the general direction of the glacial flow. It is the product of the streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A low mound, ridge, bank, or hill of loose, windblown, granular material (generally sand), either barren or covered with vegetation, that is capable of movement from place to place but always retains its characteristic shape.

Duripan. A subsurface soil horizon that is cemented with illuvial silica, commonly opal or microcrystalline forms, to the degree that less than 50 percent of the volume of air-dry fragments will slake in water or hydrochloric acid.

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.

Eolian material. Material transported and deposited by wind, including earth material such as dune sand, sand sheets, loess, and clay.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A concentration of gravel or coarser fragments that remains on the soil surface after finer particles have been removed by running water or wind.

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.

Esker. A long, narrow, sinuous, steep-sided ridge of irregularly stratified sand and gravel deposited by a subglacial or supraglacial stream flowing between ice walls or in an ice tunnel of a retreating glacier. Eskers are less than 1 kilometer to more than 160 kilometers long and 3 to 30 meters high.

Extrusive. Pertaining to igneous rock and sediment derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface, including lava flows and tephra deposits.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Family, soil. The most specific hierarchical category in soil taxonomy.

Fan piedmont. The most extensive landform on piedmont slopes that is formed either by the lateral downslope coalescence of mountain-front alluvial fans into one generally smooth slope with or without the transverse undulations of the semiconical alluvial fans or by the accretion of fan aprons.

Fan remnant. A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, fan aprons, inset fans, and fan skirts, that either have been dissected (erosional fan remnants) or partially buried (nonburied fan remnants). An erosional fan remnant has a relatively flat summit that is a relict fan surface. A nonburied fan remnant is a relict surface in its entirety.

Fan terrace. See Fan remnant.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. 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.

Fluvial. Of or pertaining to rivers; produced by river action.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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.

Fumarole. A hole in a volcanic region from which gases and vapors escape at high temperatures.

Fumarolic. Of or pertaining to fumaroles near volcanoes. (See Fumarole.)

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.

Gilgai. The microrelief of soils produced by expansion and contraction with changes in moisture content. It is characteristic of soils containing large amounts of smectitic clay and that swell and shrink considerably with wetting and drying. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel to the slope. Also referred to, in part or in total, as crabhole, Bay of Biscay, or hushabye in older literature.

Glacial. Of or pertaining to the presence and activity of ice and glaciers, such as glacial erosion; pertaining to distinctive features and material produced by or derived from glaciers and ice sheets, such as glacial lakes; or pertaining to an ice age or region of glaciation.

Glacial drift. See Drift.

Glacial outwash. See Outwash.

Glacial till. See Till.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated with varves or rhythmites.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Granite. A felsic igneous intrusive rock containing quartz and orthoclase with smaller amounts of sodic plagioclase and commonly muscovite.

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.

Granodiorite. An igneous intrusive rock that is intermediate between felsic and mafic in composition and contains quartz and somewhat more plagioclase than orthoclase.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A small channel with steep sides cut by the concentrated, but intermittent, flow of water commonly during and immediately following heavy rainfall or following icemelt or snowmelt. A gully generally is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Gypsum content. The percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size.

Halophytic. Pertaining to vegetation that is adapted to salty soils.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A 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.

Hogwallow. See Mound-intermound microrelief.

Holocene. The epoch of the Quaternary period of geologic time that extends from the end of the Pleistocene (about 10 to 12 thousand years ago) to the present.

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.

L horizon.—A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

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.

Hummock. Rounded or conical mound or other small rise.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

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.

Inset fan. Specific name for the flood plain of an ephemeral stream that is confined between fan remnants, ballenas, basin floor remnants, or closely opposed fan toeslopes of a basin.

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.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Level basin (or paddy).—Water is applied to a level plain surrounded by levees or dikes.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

K factor. A measurement of potential soil erodibility caused by detachment of soil particles by water.

Kame. A low mound, knob, hummock, or short irregular ridge of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier, by a supraglacial stream in a low place or hole on the surface of a glacier, or by a ponded area, some of which are at the margin of stagnant ice.

Karst (topography). The relief of an area formed by the dissolution of limestone, gypsum, or other soluble rock and characterized by sinkholes and caves and underground drainage.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit. Clastic sediment and chemical precipitates deposited in lakes.

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.

Limestone. A sedimentary rock consisting mainly of calcium carbonate (more than 50 percent) dominantly in the form of calcite. Limestone is commonly formed by a combination of organic and inorganic processes and includes chemical and clastic (soluble and insoluble) constituents. Fossils are common in limestone.

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.

Loess. Material transported and deposited by wind that consists dominantly of silt-sized clastics.

Low strength. The soil is not strong enough to support loads.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Magma. Molten rock material that originates deep in the earth and solidifies to form igneous rock.

Marl. An earthy, unconsolidated deposit consisting mainly of calcium carbonate mixed with clay in approximately equal amounts (35 to 65 percent of each). It is formed primarily under freshwater lacustrine conditions, but some is associated with a more saline environment.

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.

Mesa. A broad, nearly flat topped and commonly isolated land mass that is bounded by steep slopes or precipitous cliffs and has a nearly horizontal summit that consists of layers of resistant rock and is wider than the height of bounding escarpments. Also used to designate broad structural benches and alluvial terraces at intermediate levels in stepped sequences of platforms bordering canyons and valleys.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement in the earth's crust. Nearly all such rocks are crystalline. Examples are schist, gneiss, quartzite, slate, and marble.

Metasediment. A sediment or sedimentary rock that shows evidence of having been subjected to metamorphism.

Metavolcanic. A volcanic rock that shows evidence of metamorphism but has not been fully metamorphosed into metamorphic rock.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. 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.

Moraine (landform). A general term for a landform composed mainly of till deposited by either an active or extinct glacier. Some types are disintegration, end, lateral, recessional, and terminal.

Moraine (material). A mound, ridge, or other distinct accumulation of unsorted, unstratified glacial drift, dominantly till, primarily from glacial ice.

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).

Mound-intermound microrelief. Circular or oval domes, generally 1 to 3 feet in height and 115 to 100 feet in diameter, with intervening basin-shaped depressions that commonly do not have external drainage. Also referred to as hogwallow or mima mounds in the western United States.

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. A blocky or massive, fine-grained sedimentary rock indurated by clay and silt in approximately equal amounts. Also, a general term for clay, silt, claystone, siltstone, shale, and argillite that is used only when the amounts of clay and silt are not known or cannot be precisely determined.

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.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Ochric epipedon. A surface horizon of mineral soil that is too light in color, too high in chroma, too low in organic carbon, or too thin to be a plaggen, mollic, umbric, anthropic, or histic epipedon or that is both hard and massive when dry.

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

Outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Outwash plain. An extensive lowland area of coarse textured glaciofluvial material. An outwash plain commonly is smooth; where pitted as a result of meltout of incorporated ice masses, it generally has low relief.

Paleosol. A soil that formed in a particular area with distinctive morphological features resulting from a soil-forming environment that no longer exists in the area. The pedogenic process was either altered as a result of external environmental changes or interrupted by burial. A paleosol (or component horizon) is classified as relict if it has persisted without major alteration of morphology by the prevailing pedogenic environment. An exhumed paleosol is one that was buried and has been re-exposed by erosion of the mantle. Most paleosols have been affected by some subsequent modification of the morphology of diagnostic horizons and truncation of the profile.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated 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.

Pediment. A gently sloping erosional surface at the foot of a receding hill or mountain slope. The surface may be essentially bare, exposing earth material that extends beneath adjacent uplands, or it may have a thin mantle of alluvium and colluvium, ultimately in transit from the upland front to the basin or valley lowland. On hill footslope terrain, the mantle is designated “pedisediment.” The term pediment is used in several geomorphic contexts: (1) landscape positions, for example, intermontane basin piedmont or valley border footslope surfaces, or respectively, apron and terrace pediments; (2) type of material eroded, either bedrock or regolith; or (3) a combination of these.

Pedisediment. A layer of sediment eroded from the shoulder and backslope of an erosional slope that is being transported or was transported across a pediment.

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.

Permafrost. Soil or rock that has remained at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

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

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

PI. See Plasticity index.

Piedmont (adjective). Lying or formed at the base of a mountain or mountain range; for example, a piedmont terrace or a piedmont pediment.

Piedmont (noun). An area, plain, slope, glacier, or other feature at the base of a mountain; for example, a foothill or bajada. In the United States, the Piedmont is a low plateau that extends from New Jersey to Alabama and lies east of the Appalachian Mountains.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

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.

Plateau. A comparatively flat area of great extent and elevation. Specifically, an extensive land region considerably elevated (more than 100 meters) above adjacent lower lying terrain that is commonly limited on at least one side by an abrupt descent and has a flat or nearly level surface. A relatively large part of a plateau surface is near summit level.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playas consist of fine grained deposits and may or may not have a high water table and may or may not be saline.

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.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

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.

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.

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.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. All unconsolidated earth material above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits. Soil scientists regard as soil only that part of the regolith that has been modified by organisms and soil-forming processes. Most engineers describe the entire regolith, even to a great depth, as “soil.”

Relief. The elevations or inequalities of a land surface, considered collectively.

Remnant. The remaining part of a larger landform or land surface that has been dissected or partially buried.

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.

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

Saline-sodic soil. A soil that contains sufficient exchangeable sodium to interfere with the growth of most crops and appreciable quantities of soluble salts. The exchangeable sodium ratio is greater than 0.15; the conductivity of the soil solution, when saturated, is greater than 4 decisiemens per meter (at 25 degrees C); and the pH is commonly 8.5 or less when the soil is saturated.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy. 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.

Saprolite. Soft, friable, isovolumetrically weathered bedrock that retains the fabric and structure of the parent rock and exhibits extensive intercrystal and intracrystal weathering. In pedology, saprolite has been used to refer to any unconsolidated residual material that underlies the soil and grades to hard bedrock below.

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.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

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. All the soils of a given series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock that formed as a result of the induration of a clay, silty clay, or silty clay loam deposit and has the tendency to split into thin layers (fissility).

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.

Sinkhole. A closed depression formed either by the solution of the surficial material, such as limestone, gypsum, and salt, or by the collapse of underlying caves. Complexes of sinkholes in carbonate-rich terrain are the main components of karst topography.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Site index (pinyon and juniper). A designation of the quality of a pinyon or juniper stand based on the basal area in square feet when the stand averages 5 inches in diameter 1 foot above the ground. A site index of 50 means that the stand will have a basal area of 50 square feet.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

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 $Ca^{++} + Mg^{++}$.

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 erosion factors. The Kw and Kf factors quantify the susceptibility of soil to detachment by water. These erosion 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.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless*soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

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.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

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.

Talus. Rock fragments of any size or shape (commonly coarse and angular) at the base of a cliff or very steep rock slope; the accumulated mass of such loose, broken rock formed mainly by falling, rolling, or sliding.

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 are defined in “Keys to Soil Taxonomy” (Soil Survey Staff, 2006).

Terminal moraine. An end moraine that marks the farthest advance of a glacier and commonly has the form of a massive arcuate or concentric ridge, or complex of ridges, underlain by till and other types of drift.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

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.”

Till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The outermost inclined surface at the base of a hill; part of a footslope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Torric moisture regime. See Aridic moisture regime.

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.

Valley fill. The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) that fills or partly fills a valley.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Vegetative cover. The crown cover of all live plants in relation to the ground surface.

Vernal pool. A shallow surficial depression that is temporarily filled with water during periods of rain in winter and spring and is desiccated during the dry summer months. It occurs as a small poorly drained depression perched above an impermeable or very slowly permeable soil horizon or bedrock.

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.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
156	Tongva-Freeboard-Starbright complex, 30 to 55 percent slopes	1,089	2.2
157	Tongva-Pachic Argixerolls-Freeboard complex, 55 to 75 percent slopes	1,654	3.4
160	Beaches-Abaft complex, 0 to 5 percent slopes	28	*
181	Haploxerepts-Purser-Rock outcrop complex, 40 to 75 percent slopes	1,320	2.7
182	Luff-Haploxerepts-Haploxeralfs complex, 15 to 35 percent slopes	2,551	5.3
183	Purser-Luff complex, 15 to 35 percent slopes	586	1.2
184	Dewpoint-Luff association, 15 to 45 percent slopes	213	0.4
185	Purser-Rock outcrop complex, 45 to 75 percent slopes, coastal cliffs	268	0.6
190	Typic Xerofluvents-Riverwash complex, 0 to 8 percent slopes	48	*
191	Typic Haploxerepts-Typic Xerofluvents-Argixerolls complex, 0 to 8 percent slopes	296	0.6
293	Rock outcrop, coastal cliffs-Nauti-Haploxerepts complex, 50 to 120 percent slopes	661	1.4
400	Oboship-Nauti-Bosun complex, 50 to 75 percent slopes	7,385	15.3
407	Nauti-Flyer-Marpol complex, 25 to 55 percent slopes	2,949	6.1
410	Express-Flyer-Loadline complex, 40 to 75 percent slopes	1,526	3.2
411	Flyer-Loadline-Nauti complex, 15 to 50 percent slopes	941	1.9
412	Flyer, gullied-Express, gullied-Bosun complex, 15 to 50 percent slopes	947	2.0
420	Masthead-Luff complex, 5 to 15 percent slopes	322	0.7
421	Masthead-Luff complex, 8 to 30 percent slopes	240	0.5
422	Dewpoint-Masthead-Coastwise complex, 20 to 55 percent slopes	9,568	19.8
423	Masthead-Coastwise-Dewpoint complex, 20 to 55 percent slopes	9,389	19.4
424	Masthead-Dewpoint-Rock outcrop complex, 40 to 75 percent slopes	897	1.9
425	Coastwise-Masthead complex, 40 to 75 percent slopes, cobbly	904	1.9
427	Masthead-Coastwise-Typic Haploxeralfs complex, 45 to 75 percent slopes	3,888	8.0
450	Urban land-Xerorthents, landscaped, association, 0 to 8 percent slopes	94	0.2
451	Nauti, landscaped-Urban land complex, 8 to 30 percent slopes	140	0.3
453	Typic Argixerolls-Urban land, landscaped, complex, 2 to 8 percent slopes	98	0.2
454	Typic Argixerolls-Calcic Haploxerolls-Urban land complex, 2 to 8 percent slopes, landscaped	68	0.1
456	Typic Xerorthents, fill-Typic Xerorthents, steep fill, association, 0 to 70 percent slopes	70	0.1
DAM	Dam	4	*
GP	Gravel pits	185	0.4
W	Water	71	0.1
	Total	48,400	100.0

* Less than 0.1 percent.

Table 2.--Land Capability Classification

Map symbol and component name	Land capability
156:	
Tongva	7e
Freeboard	7e
Starbright	7e
157:	
Tongva	7e
Pachic Argixerolls	7e
Freeboard	7e
160:	
Beaches	8
Abaft	4e
181:	
Haploxerepts	7e
Purser	7e
Rock outcrop	8
182:	
Luff	7e
Haploxerepts	7e
Haploxeralfs	7e
183:	
Purser	7e
Luff	7e
184:	
Dewpoint	7e
Luff	6e
185:	
Purser, coastal cliffs	8
Rock outcrop, coastal cliffs	7e
190:	
Typic Xerofluvents	7w
Riverwash	8
191:	
Typic Haploxerepts	7s
Typic Xerofluvents	7w
Argixerolls	7e
293:	
Rock outcrop	8
Nauti	7e
Haploxerepts	7e

Table 2.--Land Capability Classification--Continued

Map symbol and component name	Land capability
400:	
Oboship	7e
Nauti	7e
Bosun	7e
407:	
Nauti	7e
Flyer	7e
Marpol	7e
410:	
Express	7e
Flyer	7e
Loadline	7e
411:	
Flyer	7e
Loadline	7e
Nauti	7e
412:	
Flyer, gullied	7e
Express, gullied	7e
Bosun	7e
420:	
Masthead	7e
Luff	7e
421:	
Masthead	7e
Luff	7e
422:	
Dewpoint	7e
Masthead	7e
Coastwise	7e
423:	
Masthead	7e
Coastwise	7e
Dewpoint	7e
424:	
Masthead	7e
Dewpoint	7e
Rock outcrop	8

Table 2.--Land Capability Classification--Continued

Map symbol and component name	Land capability
425:	
Coastwise, cobbly	7e
Masthead, cobbly	7e
427:	
Masthead	7e
Coastwise, cobbly	7e
Typic Haploxeralfs	7e
450:	
Urban land.	
Xerorthents, landscaped	3e
451:	
Nauti, landscaped	7e
Urban land.	
453:	
Typic Argixerolls	7e
Urban land, landscaped.	
454:	
Typic Argixerolls, landscaped	7e
Calcic Haploxerolls, landscaped	7e
Urban land, landscaped.	
456:	
Typic Xerorthents, fill	7e
Typic Xerorthents, steep fill	7e
DAM.	
Dam	
GP.	
Gravel pits	
W.	
Water	

Table 3a.--Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
156:							
Tongva	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
						Bedrock 20-40" and slope >2%	0.50
Freeboard	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Starbright	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
157:							
Tongva	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
Pachic Argixerolls	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" >3%	1.00	Fragments >10" >3%	1.00	Fragments >10" >3%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Freeboard	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
160:							
Beaches	75	Not rated		Not rated		Not rated	
Abaft	15	Limitations		Limitations		Limitations	
		Surface sand fractions 70-90% by wt.	0.55	Surface sand fractions 70-90% by wt.	0.55	Surface sand fractions 70-90% by wt.	0.55
						Slopes 2 to 6%	0.02

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
181:							
Haploxerepts	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" >3%	1.00	Fragments >10" >3%	1.00	Fragments >10" >3%	1.00
		Surface sand fractions 70-90% by wt.	0.88	Surface sand fractions 70-90% by wt.	0.88	Surface sand fractions 70-90% by wt.	0.88
Purser	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Dusty	0.50	Dusty	0.50	Surface fragments (<3") >25%	1.00
Rock outcrop	15	Not rated		Not rated		Not rated	
182:							
Luff	35	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Surface fragments (<3") >25%	0.99
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Bedrock 20-40" and slope >2%	0.50
Haploxerepts	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Haploxeralfs	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
183:							
Purser	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76
Luff	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Fragments >3" 5 to 30%	0.92
						Permeability .06-.6"/hr	0.46

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
184:							
Dewpoint	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" >3%	1.00	Fragments >10" >3%	1.00	Fragments >10" >3%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Bedrock 20-40" and slope >2%	0.50
Luff	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Bedrock depth < 20"	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Dusty	0.50
185:							
Purser, coastal cliffs	65	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Rock outcrop, coastal cliffs	20	Not rated		Not rated		Not rated	
190:							
Typic Xerofluvents	70	Limitations		Limitations		Limitations	
		Flooding >= rare	1.00	Ponding (any duration)	1.00	Flooding > occasional	1.00
		Ponding (any duration)	1.00	Frequent flooding	0.50	Ponding (any duration)	1.00
						Slopes 2 to 6%	0.50
Riverwash	15	Not rated		Not rated		Not rated	
191:							
Typic Haploxerepts	40	Limitations		No limitations		Limitations	
		Flooding >= rare	1.00			Slopes 2 to 6%	0.74
						Occasional flooding	0.50
Typic Xerofluvents	30	Limitations		Limitations		Limitations	
		Flooding >= rare	1.00	Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Ponding (any duration)	1.00			Slopes 2 to 6%	0.74
						Occasional flooding	0.50
Argixerolls	20	Limitations		Limitations		Limitations	
		Flooding >= rare	1.00	Fragments (<3") > 50%	1.00	Surface fragments (<3") >25%	1.00
		Fragments (<3") > 50%	1.00	Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76
		Fragments >10" .1 to 3%	0.76	Surface sand fractions 70-90% by wt.	0.50	Slopes 2 to 6%	0.74

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
293:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Nauti	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Haploxerepts	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
						Fragments >3" 5 to 30%	0.03
400:							
Oboship	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
Nauti	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Bosun	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Organic surface layer >= 4" thick	1.00	Organic surface layer >= 4" thick	1.00	Organic surface layer >= 4" thick	1.00
407:							
Nauti	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Flyer	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments (<3") 25-50%	0.01	Fragments (<3") 25-50%	0.01	Surface fragments (<3") >25%	1.00
						Fragments >3" 5 to 30%	0.01
Marpol	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
410:							
Express	35	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
Flyer	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
Loadline	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Surface sand fractions 70-90% by wt.	0.36	Surface sand fractions 70-90% by wt.	0.36	Surface sand fractions 70-90% by wt.	0.36
411:							
Flyer	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
Loadline	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
Nauti	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.50	Permeability .06-.6"/hr	0.50	Permeability .06-.6"/hr	0.50
		Dusty	0.50	Dusty	0.50	Dusty	0.50
412:							
Flyer, gullied	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" .1 to 3%	0.19	Fragments >10" .1 to 3%	0.19	Fragments >10" .1 to 3%	0.19
		Surface sand fractions 70-90% by wt.	0.12	Surface sand fractions 70-90% by wt.	0.12	Surface sand fractions 70-90% by wt.	0.12
Express, gullied	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" .1 to 3%	0.19	Fragments >10" .1 to 3%	0.19	Fragments >10" .1 to 3%	0.19
Bosun	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" .1 to 3%	0.19	Fragments >10" .1 to 3%	0.19	Fragments >10" .1 to 3%	0.19

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Limitations	Value	Limitations	Value	Limitations	Value
420:							
Masthead	45	Limitations		Limitations		Limitations	
		Dusty	0.50	Dusty	0.50	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Dusty	0.50
		Slopes 8 to 15%	0.16	Slopes 8 to 15%	0.16	Permeability .06-.6"/hr	0.46
Luff	40	Limitations		Limitations		Limitations	
		Dusty	0.50	Dusty	0.50	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Dusty	0.50
		Slopes 8 to 15%	0.16	Slopes 8 to 15%	0.16	Permeability .06-.6"/hr	0.46
421:							
Masthead	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Luff	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.50	Permeability .06-.6"/hr	0.50	Permeability .06-.6"/hr	0.50
422:							
Dewpoint	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Masthead	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Coastwise	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
423:							
Masthead	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments (<3") 25-50%	0.56	Fragments (<3") 25-50%	0.56	Surface fragments (<3") >25%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Value	Picnic areas: Limitations	Value	Playgrounds: Limitations	Value
423:							
Coastwise	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Dewpoint	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
424:							
Masthead	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments (<3") 25-50%	0.92	Fragments (<3") 25-50%	0.92	Surface fragments (<3") >25%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Dewpoint	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Rock outcrop	15	Not rated		Not rated		Not rated	
425:							
Coastwise, cobbly	60	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76
Masthead, cobbly	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" >3%	1.00	Fragments >10" >3%	1.00	Fragments >10" >3%	1.00
		Dusty	0.50	Dusty	0.50	Surface fragments (<3") >25%	0.99
427:							
Masthead	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Surface fragments (<3") >25%	1.00
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Dusty	0.50

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
427:							
Coastwise, cobbly-------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00	Bedrock depth < 20"	1.00
		Fragments >10" >3%	1.00	Fragments >10" >3%	1.00	Surface fragments (<3") >25%	1.00
Typic Haploxeralfs------	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
450:							
Urban land--------------	70	Not rated		Not rated		Not rated	
Xerorthents, landscaped	30	No limitations		No limitations		Limitations	
						Slopes 2 to 6%	0.74
451:							
Nauti, landscaped-------	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46
Urban land--------------	30	Not rated		Not rated		Not rated	
453:							
Typic Argixerolls-------	70	Limitations		Limitations		Limitations	
		Dusty	0.50	Dusty	0.50	Slopes 2 to 6%	0.74
		Permeability .06-.6"/hr	0.46	Permeability .06-.6"/hr	0.46	Dusty	0.50
						Permeability .06-.6"/hr	0.46
Urban land, landscaped--	15	Not rated		Not rated		Not rated	
454:							
Typic Argixerolls, landscaped------------	50	No limitations		No limitations		Limitations	
						Slopes 2 to 6%	0.50
Calcic Haploxerolls, landscaped------------	25	No limitations		No limitations		Limitations	
						Slopes 2 to 6%	0.02
Urban land, landscaped--	15	Not rated		Not rated		Not rated	

Table 3a.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Camp areas: Limitations	Camp areas: Value	Picnic areas: Limitations	Picnic areas: Value	Playgrounds: Limitations	Playgrounds: Value
456:							
Typic Xerorthents, fill	60	Limitations		Limitations		Limitations	
		Dusty	0.50	Dusty	0.50	Surface fragments (<3") >25%	1.00
		Fragments (<3") 25-50%	0.10	Fragments (<3") 25-50%	0.10	Dusty	0.50
						Slopes 2 to 6%	0.02
Typic Xerorthents, steep fill-------------------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 6%	1.00
		Fragments >10" .1 to 3%	0.76	Fragments >10" .1 to 3%	0.76	Surface fragments (<3") 10-25%	0.98
		Dusty	0.50	Dusty	0.50	Fragments >10" .1 to 3%	0.76
DAM:							
Dam---------------------	100	Not rated		Not rated		Not rated	
GP:							
Gravel pits-------------	100	Not rated		Not rated		Not rated	
W:							
Water-------------------	100	Not rated		Not rated		Not rated	

The interpretation for camp areas evaluates the following soil properties at variable depths in the soil: flooding; ponding; wetness; slope; depth to bedrock; depth to a cemented pan; fragments less than, equal to, or more than 3 inches in size; sodium content (SAR); salinity (EC); a clayey surface layer; Unified classes for a high content of organic matter (PT, OL, and OH); soil dustiness; and permeability (Ksat) that is too rapid, allowing seepage in some climates.

The interpretation for picnic areas evaluates the following soil properties at variable depths in the soil: flooding, ponding, wetness, slope, depth to bedrock, depth to a cemented pan, salinity (EC), pH, soil dustiness, fragments more than 3 inches in size, surface fragments more than 10 inches in size, the amount of sand or clay in the surface layer, Unified classes for a high content of organic matter (PT, OL, and OH), and permeability (Ksat) that is too rapid, allowing seepage in some climates.

The interpretation for playgrounds evaluates the following soil properties at variable depths in the soil: flooding, ponding, wetness, slope, depth to bedrock, depth to a cemented pan, surface fragments more than 10 inches in size, fragments equal to or less than 3 inches in size, Unified class for a high content of organic matter (PT, OL, and OH), soil dustiness, sand or clay content in the surface layer, pH, salinity (EC), and permeability (Ksat) that is too rapid, allowing seepage in some climates.

Table 3b.--Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value	Limitations	Value
156:							
Tongva------------------	40	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00			Bedrock depth 20 to 40"	0.50
Freeboard---------------	30	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
Starbright--------------	15	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
						Bedrock depth 20 to 40"	0.18
157:							
Tongva------------------	40	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00			Bedrock depth 20 to 40"	0.80
						AWC 2-4" to 40"	0.03
Pachic Argixerolls------	30	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Fragments >10" >3%	1.00	Surface fragments (>10") >3% coverage	1.00	Bedrock depth 20 to 40"	0.08
		Dusty	0.50				
				Dusty	0.50		
Freeboard---------------	15	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
160:							
Beaches-----------------	75	Not rated		Not rated		Not rated	
Abaft-------------------	15	Limitations		Limitations		Limitations	
		Surface sand fractions 70-90% by wt.	0.55	Surface sand fractions 70-90% by wt.	0.55	AWC 2-4" to 40"	0.69

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails: Limitations	Value	Off-road motorcycle trails: Limitations	Value	Lawns, landscaping, and golf fairways: Limitations	Value
181:							
Haploxerepts	40	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Fragments >10" >3%	1.00	Surface fragments (>10") >3% coverage	1.00	AWC 2-4" to 40"	0.63
		Surface sand fractions 70-90% by wt.	0.88	Surface sand fractions 70-90% by wt.	0.88	Bedrock depth 20 to 40"	0.02
Purser	30	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Bedrock depth < 20"	1.00
		Dusty	0.50	Dusty	0.50	Slopes > 15%	1.00
						AWC < 2" to 40"	1.00
Rock outcrop	15	Not rated		Not rated		Not rated	
182:							
Luff	35	Limitations		Limitations		Limitations	
		Slopes 15 - 25%	0.50	Dusty	0.50	Slopes > 15%	1.00
		Dusty	0.50			Bedrock depth 20 to 40"	0.82
						AWC 2-4" to 40"	0.31
Haploxerepts	30	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Surface fragments (>10") .1-3% coverage	0.76	Slopes > 15%	1.00
		Fragments >10" .1 to 3%	0.76	Slopes 25 to 40%	0.22		
Haploxeralfs	20	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.78	Slopes > 15%	1.00
183:							
Purser	55	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Surface fragments (>10") .1-3% coverage	0.76	Bedrock depth < 20"	1.00
		Fragments >10" .1 to 3%	0.76			Slopes > 15%	1.00
				Slopes 25 to 40%	0.22	AWC < 2" to 40"	1.00
Luff	25	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.22	Slopes > 15%	1.00
						Fragments >3" 5 to 30%	0.92
						Bedrock depth 20 to 40"	0.08

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value	Limitations	Value
184:							
Dewpoint----------------	45	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Surface fragments (>10") >3% coverage	1.00	Slopes > 15%	1.00
		Fragments >10" >3%	1.00	Slopes 25 to 40%	0.22	Bedrock depth 20 to 40"	0.58
						AWC 2-4" to 40"	0.06
Luff--------------------	30	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Slopes 25 to 40%	0.94	Slopes > 15%	1.00
		Slopes > 25%	1.00	Dusty	0.50	Bedrock depth < 20"	1.00
		Dusty	0.50			AWC 2-4" to 40"	0.45
185:							
Purser, coastal cliffs--	65	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Bedrock depth < 20"	1.00
		Dusty	0.50	Dusty	0.50	Slopes > 15%	1.00
						AWC < 2" to 40"	1.00
Rock outcrop, coastal cliffs-----------------	20	Not rated		Not rated		Not rated	
190:							
Typic Xerofluvents------	70	Limitations		Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Frequent flooding	0.50	Frequent flooding	0.50	Frequent flooding	0.90
						AWC 2-4" to 40"	0.06
Riverwash---------------	15	Not rated		Not rated		Not rated	
191:							
Typic Haploxerepts------	40	No limitations		No limitations		Limitations	
						AWC 2-4" to 40"	0.87
						Occasional flooding	0.80
Typic Xerofluvents------	30	Limitations		Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00	Ponding (any duration)	1.00
						Occasional flooding	0.80
						AWC 2-4" to 40"	0.41
Argixerolls-------------	20	Limitations		Limitations		Limitations	
		Fragments >10" .1 to 3%	0.76	Surface fragments (>10") .1-3% coverage	0.76	Fragments (gravel-size) >50%	1.00
		Surface sand fractions 70-90% by wt.	0.50	Surface sand fractions 70-90% by wt.	0.50	Occasional flooding	0.80
						Loamy coarse sand surface	0.50

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails: Limitations	Paths and trails: Value	Off-road motorcycle trails: Limitations	Off-road motorcycle trails: Value	Lawns, landscaping, and golf fairways: Limitations	Lawns, landscaping, and golf fairways: Value
293:							
Rock outcrop-----------	65	Not rated		Not rated		Not rated	
Nauti------------------	15	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00	Dusty	0.50	Bedrock depth 20 to 40"	0.32
		Dusty	0.50				
Haploxerepts-----------	15	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Bedrock depth < 20"	1.00
		K factor >.35 and slopes >8%	1.00			Slopes > 15%	1.00
						AWC < 2" to 40"	0.99
400:							
Oboship----------------	40	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
Nauti------------------	25	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00	Dusty	0.50	Bedrock depth 20 to 40"	0.32
		Dusty	0.50				
Bosun------------------	20	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Organic surface layer >= 4" thick	1.00	Organic surface layer >= 4" thick	1.00	Organic surface layer >= 4" thick	1.00
						AWC 2-4" to 40"	0.94
407:							
Nauti------------------	55	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Dusty	0.50	Dusty	0.50	Bedrock depth 20 to 40"	0.16
Flyer------------------	15	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
						AWC 2-4" to 40"	0.10
						Bedrock depth 20 to 40"	0.08
Marpol-----------------	15	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00	Dusty	0.50		
		Dusty	0.50				

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value	Limitations	Value
410:							
Express	35	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
						Bedrock depth 20 to 40"	0.18
						AWC 2-4" to 40"	0.01
Flyer	30	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00			Bedrock depth 20 to 40"	0.92
						AWC 2-4" to 40"	0.11
Loadline	20	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Surface sand fractions 70-90% by wt.	0.36	Surface sand fractions 70-90% by wt.	0.36	Bedrock depth < 20"	1.00
						AWC < 2" to 40"	0.99
411:							
Flyer	45	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Slopes 25 to 40%	0.78	Slopes > 15%	1.00
						Bedrock depth 20 to 40"	0.92
		Slopes > 25%	1.00			AWC 2-4" to 40"	0.11
Loadline	25	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Slopes 25 to 40%	0.22	Slopes > 15%	1.00
						AWC < 2" to 40"	1.00
		Slopes > 25%	1.00			Bedrock depth < 20"	1.00
Nauti	15	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Slopes 25 to 40%	0.78	Slopes > 15%	1.00
				Dusty	0.50	Bedrock depth 20 to 40"	0.08
		Slopes > 25%	1.00				
		Dusty	0.50				
412:							
Flyer, gullied	30	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.22	Slopes > 15%	1.00
		Fragments >10" .1 to 3%	0.19	Surface fragments (>10") .1-3% coverage	0.19	AWC 2-4" to 40"	0.98
		Surface sand fractions 70-90% by wt.	0.12			Bedrock depth 20 to 40"	0.92
				Surface sand fractions 70-90% by wt.	0.12		
Express, gullied	25	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Surface fragments (>10") .1-3% coverage	0.19	Slopes > 15%	1.00
		Fragments >10" .1 to 3%	0.19			AWC 2-4" to 40"	0.26
				Slopes 25 to 40%	0.04		

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value	Limitations	Value
412:							
Bosun	20	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.22	Slopes > 15%	1.00
		Fragments >10" .1 to 3%	0.19	Surface fragments (>10") .1-3% coverage	0.19	AWC 2-4" to 40"	0.05
420:							
Masthead	45	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Dusty	0.50	Bedrock depth 20 to 40"	0.68
		Dusty	0.50			Slopes 8 to 15%	0.16
Luff	40	Limitations		Limitations		Limitations	
		Dusty	0.50	Dusty	0.50	Bedrock depth 20 to 40"	0.98
						AWC 2-4" to 40"	0.45
						Slopes 8 to 15%	0.16
421:							
Masthead	45	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Dusty	0.50	Slopes > 15%	1.00
		Slopes 15 - 25%	0.50			Bedrock depth 20 to 40"	0.68
		Dusty	0.50				
Luff	40	No limitations		No limitations		Limitations	
						Slopes > 15%	1.00
						AWC < 2" to 40"	1.00
422:							
Dewpoint	40	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.78	Slopes > 15%	1.00
						Bedrock depth 20 to 40"	0.18
Masthead	25	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Slopes 25 to 40%	0.78	Slopes > 15%	1.00
		Slopes > 25%	1.00	Dusty	0.50	Bedrock depth 20 to 40"	0.92
		Dusty	0.50				
Coastwise	15	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.78	Bedrock depth < 20"	1.00
		Dusty	0.50	Dusty	0.50	Slopes > 15%	1.00
						AWC 2-4" to 40"	0.30

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails: Limitations	Value	Off-road motorcycle trails: Limitations	Value	Lawns, landscaping, and golf fairways: Limitations	Value
423:							
Masthead	40	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.78	Slopes > 15%	1.00
		Dusty	0.50	Dusty	0.50	Fragments (gravel size) 25-50%	0.55
						Bedrock depth 20 to 40"	0.50
Coastwise	25	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes 25 to 40%	0.78	Bedrock depth < 20"	1.00
						Slopes > 15%	1.00
						AWC 2-4" to 40"	0.94
Dewpoint	20	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Slopes 25 to 40%	0.78	Slopes > 15%	1.00
						AWC < 2" to 40"	1.00
		Slopes > 25%	1.00			Bedrock depth 20 to 40"	0.50
424:							
Masthead	45	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Dusty	0.50	Dusty	0.50	Fragments (gravel size) 25-50%	0.92
Dewpoint	30	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00			AWC < 2" to 40"	1.00
						Bedrock depth 20 to 40"	0.08
Rock outcrop	15	Not rated		Not rated		Not rated	
425:							
Coastwise, cobbly	60	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Bedrock depth < 20"	1.00
		Fragments >10" .1 to 3%	0.76	Surface fragments (>10") .1-3% coverage	0.76	Slopes > 15%	1.00
		Dusty	0.50			AWC 2-4" to 40"	0.84
				Dusty	0.50		
Masthead, cobbly	25	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Fragments >10" >3%	1.00	Surface fragments (>10") >3% coverage	1.00	Bedrock depth 20 to 40"	0.46
		Dusty	0.50			Fragments >3" 5 to 30%	0.01
				Dusty	0.50		

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Lawns, landscaping, and golf fairways	
		Limitations	Value	Limitations	Value	Limitations	Value
427:							
Masthead	40	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Dusty	0.50	Dusty	0.50	Bedrock depth 20 to 40"	0.32
						Fragments (gravel size) 25-50%	0.17
Coastwise, cobbly	25	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Bedrock depth < 20"	1.00
		Fragments >10" >3%	1.00	Surface fragments (>10") >3% coverage	1.00	Slopes > 15%	1.00
						AWC < 2" to 40"	0.99
Typic Haploxeralfs	20	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		K factor >.35 and slopes >8%	1.00			Bedrock depth 20 to 40"	0.95
						AWC 2-4" to 40"	0.92
450:							
Urban land	70	Not rated		Not rated		Not rated	
Xerorthents, landscaped	30	No limitations		No limitations		Limitations	
						AWC < 2" to 40"	1.00
451:							
Nauti, landscaped	55	Limitations		Limitations		Limitations	
		K factor >.35 and slopes >8%	1.00	Dusty	0.50	Slopes > 15%	1.00
		Slopes 15 - 25%	0.50			Bedrock depth 20 to 40"	0.32
		Dusty	0.50				
Urban land	30	Not rated		Not rated		Not rated	
453:							
Typic Argixerolls	70	Limitations		Limitations		No limitations	
		Dusty	0.50	Dusty	0.50		
Urban land, landscaped	15	Not rated		Not rated		Not rated	
454:							
Typic Argixerolls, landscaped	50	No limitations		No limitations		No limitations	
Calcic Haploxerolls, landscaped	25	No limitations		No limitations		No limitations	

Table 3b.--Recreational Development--Continued

Map symbol and component name	Pct. of map unit	Paths and trails: Limitations	Paths and trails: Value	Off-road motorcycle trails: Limitations	Off-road motorcycle trails: Value	Lawns, landscaping, and golf fairways: Limitations	Lawns, landscaping, and golf fairways: Value
454:							
Urban land, landscaped--	15	Not rated		Not rated		Not rated	
456:							
Typic Xerorthents, fill	60	Limitations		Limitations		Limitations	
		Dusty	0.50	Dusty	0.50	Fragments (gravel size) 25-50%	0.10
Typic Xerorthents, steep fill-------------------	25	Limitations		Limitations		Limitations	
		Slopes > 25%	1.00	Slopes > 40%	1.00	Slopes > 15%	1.00
		Fragments >10" .1 to 3%	0.76	Surface fragments (>10") .1-3% coverage	0.76	Fragments >3" 5 to 30%	0.05
		Dusty	0.50				
				Dusty	0.50		
DAM:							
Dam---------------------	100	Not rated		Not rated		Not rated	
GP:							
Gravel pits-------------	100	Not rated		Not rated		Not rated	
W:							
Water-------------------	100	Not rated		Not rated		Not rated	

The interpretation for paths and trails evaluates the following soil properties at variable depths in the soil: flooding; ponding; wetness; slope; fragments less than, equal to, or more than 3 inches in size; clay and sand content in the surface layer; surface fragments more than or equal to 10 inches in size; Unified classes for a high content of organic matter (PT, OL, and OH); soil dustiness; and the hazard of water erosion.

The interpretation for off-road motorcycle trails evaluates the following soil properties at variable depths in the soil: flooding; ponding; wetness; slope; soil dustiness; fragments less than, equal to, or more than 3 inches in size; sand or clay content in the surface layer; and Unified classes for a high content of organic matter (PT, OL, and OH).

The interpretation for lawns, landscaping, and golf fairways evaluates the following soil properties at variable depths in the soil: flooding; ponding; wetness; slope; depth to bedrock; depth to a cemented pan; fragments less than, equal to, or more than 3 inches in size; Unified classes for a high content of organic matter (PT, OL, and OH); soil dustiness; sand or clay content in the surface layer; surface fragments more than or equal to 10 inches in size; pH; salinity (EC); sodium content (SAR); calcium carbonates; and sulfur content.

Table 4a.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
156:							
Tongva	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.50		
Freeboard	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP >6)	0.99	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	0.99
Starbright	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
157:							
Tongva	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.79		
Pachic Argixerolls	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
				Bedrock (soft) from 20 to 40"	0.08		
Freeboard	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
160:							
Beaches	75	Not rated		Not rated		Not rated	
Abaft	15	No limitations		No limitations		No limitations	

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
181:							
Haploxerepts------------	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.50		
Purser------------------	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Bedrock (hard) < 20" depth	1.00	Bedrock (hard) < 40" depth	1.00	Bedrock (hard) < 20" depth	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
Rock outcrop------------	15	Not rated		Not rated		Not rated	
182:							
Luff--------------------	35	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP >6)	1.00	Bedrock (hard) < 40" depth	1.00	Shrink-swell (LEP >6)	1.00
		Bedrock (hard) from 20 to 40"	0.82	Shrink-swell (LEP >6)	1.00	Bedrock (hard) from 20 to 40"	0.82
Haploxerepts------------	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
Haploxeralfs------------	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
183:							
Purser------------------	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Bedrock (hard) < 20" depth	1.00	Bedrock (hard) < 40" depth	1.00	Bedrock (hard) < 20" depth	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
Luff--------------------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP >6)	0.99	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	0.99
		Bedrock (hard) from 20 to 40"	0.74	Bedrock (hard) < 40" depth	1.00	Bedrock (hard) from 20 to 40"	0.74

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements: Limitations	Value	Dwellings with basements: Limitations	Value	Small commercial buildings: Limitations	Value
184:							
Dewpoint	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Bedrock (hard) < 40" depth	1.00	Shrink-swell (LEP 3-6)	0.78
		Bedrock (hard) from 20 to 40"	0.57	Shrink-swell (LEP 3-6)	0.78	Bedrock (hard) from 20 to 40"	0.57
Luff	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00
		Bedrock (hard) < 20" depth	0.99	Bedrock (hard) < 40" depth	1.00	Bedrock (hard) < 20" depth	0.99
185:							
Purser, coastal cliffs	65	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Bedrock (hard) < 20" depth	1.00	Bedrock (hard) < 40" depth	1.00	Bedrock (hard) < 20" depth	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
Rock outcrop, coastal cliffs	20	Not rated		Not rated		Not rated	
190:							
Typic Xerofluvents	70	Limitations		Limitations		Limitations	
		Ponded (any duration)	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Flooding >= rare	1.00	Flooding >= rare	1.00	Flooding >= rare	1.00
						Slopes 4 to 8%	0.02
Riverwash	15	Not rated		Not rated		Not rated	
191:							
Typic Haploxerepts	40	Limitations		Limitations		Limitations	
		Flooding >= rare	1.00	Flooding >= rare	1.00	Flooding >= rare	1.00
						Slopes 4 to 8%	0.26
Typic Xerofluvents	30	Limitations		Limitations		Limitations	
		Ponded (any duration)	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Flooding >= rare	1.00	Flooding >= rare	1.00	Flooding >= rare	1.00
						Slopes 4 to 8%	0.26
Argixerolls	20	Limitations		Limitations		Limitations	
		Flooding >= rare	1.00	Flooding >= rare	1.00	Flooding >= rare	1.00
						Slopes 4 to 8%	0.26

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements: Limitations	Value	Dwellings with basements: Limitations	Value	Small commercial buildings: Limitations	Value
293:							
Rock outcrop-----------	65	Not rated		Not rated		Not rated	
Nauti------------------	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.50	Shrink-swell (LEP 3-6)	0.50	Shrink-swell (LEP 3-6)	0.50
				Bedrock (soft) from 20 to 40"	0.32		
Haploxerepts-----------	15	Limitations		Limitations		Limitations	
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00	Slopes > 8%	1.00
400:							
Oboship----------------	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
Nauti------------------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.50	Shrink-swell (LEP 3-6)	0.50	Shrink-swell (LEP 3-6)	0.50
				Bedrock (soft) from 20 to 40"	0.32		
Bosun------------------	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
407:							
Nauti------------------	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.15		
Flyer------------------	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.08		
Marpol-----------------	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Bedrock (hard) from 40 to 60"	0.98	Shrink-swell (LEP 3-6)	0.78
				Shrink-swell (LEP 3-6)	0.78		

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements: Limitations	Value	Dwellings with basements: Limitations	Value	Small commercial buildings: Limitations	Value
410:							
Express	35	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.18		
Flyer	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.92		
Loadline	20	Limitations		Limitations		Limitations	
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00	Slopes > 8%	1.00
411:							
Flyer	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.92		
Loadline	25	Limitations		Limitations		Limitations	
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00	Slopes > 8%	1.00
Nauti	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.06	Bedrock (soft) from 20 to 40"	0.08	Shrink-swell (LEP 3-6)	0.06
				Shrink-swell (LEP 3-6)	0.06		
412:							
Flyer, gullied	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.92		
Express, gullied	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
Bosun	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements: Limitations	Value	Dwellings with basements: Limitations	Value	Small commercial buildings: Limitations	Value
420:							
Masthead----------------	45	Limitations		Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Slopes > 8%	1.00
		Slopes 8 to 15%	0.16	Bedrock (soft) from 20 to 40"	0.68	Shrink-swell (LEP >6)	1.00
				Slopes 8 to 15%	0.16		
Luff--------------------	40	Limitations		Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Slopes > 8%	1.00
		Slopes 8 to 15%	0.16	Bedrock (soft) from 20 to 40"	0.98	Shrink-swell (LEP >6)	1.00
				Slopes 8 to 15%	0.16		
421:							
Masthead----------------	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
				Bedrock (soft) from 20 to 40"	0.68		
Luff--------------------	40	Limitations		Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Shrink-swell (LEP >6)	1.00	Slopes > 8%	1.00
		Slopes > 15%	1.00	Slopes > 15%	1.00	Shrink-swell (LEP >6)	1.00
422:							
Dewpoint----------------	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
				Bedrock (soft) from 20 to 40"	0.18		
Masthead----------------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Bedrock (soft) from 20 to 40"	0.92	Shrink-swell (LEP 3-6)	0.78
				Shrink-swell (LEP 3-6)	0.78		
Coastwise---------------	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Bedrock (hard) < 20" depth	1.00	Bedrock (hard) < 40" depth	1.00	Bedrock (hard) < 20" depth	1.00
		Shrink-swell (LEP 3-6)	0.22	Shrink-swell (LEP 3-6)	0.22	Shrink-swell (LEP 3-6)	0.22

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
423:							
Masthead	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
				Bedrock (soft) from 20 to 40"	0.50		
Coastwise	25	Limitations		Limitations		Limitations	
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.22	Shrink-swell (LEP 3-6)	0.22	Shrink-swell (LEP 3-6)	0.22
Dewpoint	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
				Bedrock (soft) from 20 to 40"	0.50		
424:							
Masthead	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.01	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.01
Dewpoint	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.08		
Rock outcrop	15	Not rated		Not rated		Not rated	
425:							
Coastwise, cobbly	60	Limitations		Limitations		Limitations	
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.22	Shrink-swell (LEP 3-6)	0.22	Shrink-swell (LEP 3-6)	0.22
Masthead, cobbly	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.22	Bedrock (soft) from 20 to 40"	0.46	Shrink-swell (LEP 3-6)	0.22
				Shrink-swell (LEP 3-6)	0.22		

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Limitations	Value	Limitations	Value	Limitations	Value
427:							
Masthead----------------	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78	Shrink-swell (LEP 3-6)	0.78
				Bedrock (soft) from 20 to 40"	0.32		
Coastwise, cobbly-------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
		Bedrock (hard) < 20" depth	1.00	Bedrock (hard) < 40" depth	1.00	Bedrock (hard) < 20" depth	1.00
		Shrink-swell (LEP 3-6)	0.01			Shrink-swell (LEP 3-6)	0.01
Typic Haploxeralfs------	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.95		
450:							
Urban land--------------	70	Not rated		Not rated		Not rated	
Xerorthents, landscaped	30	Limitations		Limitations		Limitations	
		Ponded (any duration)	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Flooding >= rare	1.00	Flooding >= rare	1.00	Flooding >= rare	1.00
						Slopes 4 to 8%	0.26
451:							
Nauti, landscaped-------	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 20 to 40"	0.32		
Urban land--------------	30	Not rated		Not rated		Not rated	
453:							
Typic Argixerolls-------	70	Limitations		No limitations		Limitations	
		Shrink-swell (LEP 3-6)	0.01			Slopes 4 to 8%	0.26
						Shrink-swell (LEP 3-6)	0.01
Urban land, landscaped--	15	Not rated		Not rated		Not rated	

Table 4a.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Dwellings without basements: Limitations	Value	Dwellings with basements: Limitations	Value	Small commercial buildings: Limitations	Value
454:							
Typic Argixerolls, landscaped------------	50	Limitations		Limitations		Limitations	
		Ponded (any duration)	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Flooding >= rare	1.00	Flooding >= rare	1.00	Flooding >= rare	1.00
						Slopes 4 to 8%	0.02
Calcic Haploxerolls, landscaped------------	25	Limitations		Limitations		Limitations	
		Ponded (any duration)	1.00	Ponded (any duration)	1.00	Ponded (any duration)	1.00
		Flooding >= rare	1.00	Flooding >= rare	1.00	Flooding >= rare	1.00
Urban land, landscaped--	15	Not rated		Not rated		Not rated	
456:							
Typic Xerorthents, fill	60	No limitations		No limitations		No limitations	
Typic Xerorthents, steep fill------------------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 8%	1.00
DAM:							
Dam--------------------	100	Not rated		Not rated		Not rated	
GP:							
Gravel pits------------	100	Not rated		Not rated		Not rated	
W:							
Water------------------	100	Not rated		Not rated		Not rated	

The interpretation for dwellings without basements evaluates the following soil properties, some at variable 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 soil strength (PT, OL, and OH), depth to hard or soft bedrock, depth to a thick or thin cemented pan, and fragments more than 3 inches in size.

The interpretation for dwellings with basements evaluates the following soil properties, some at variable 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 soil strength (PT, OL, and OH), depth to hard or soft bedrock, depth to a thick or thin cemented pan, and fragments more than 3 inches in size.

The interpretation for small commercial buildings evaluates the following soil properties, some at variable 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 more than 3 inches in size.

Table 4b.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
156:					
Tongva	40	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI 5-8 (soil strength)	0.22	Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.50
Freeboard	30	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	1.00
		Shrink-swell (LEP >6)	0.99		
Starbright	15	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Clay from 40 to 60%	0.12
		Shrink-swell (LEP 3-6)	0.78	Caving potential	0.10
157:					
Tongva	40	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.79
Pachic Argixerolls	30	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		Shrink-swell (LEP 3-6)	0.78	Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.08
Freeboard	15	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		Shrink-swell (LEP >6)	1.00	Caving potential	1.00
		AASHTO GI >8 (low soil strength)	1.00		
160:					
Beaches	75	Not rated		Not rated	
Abaft	15	No limitations		Limitations	
				Caving potential	1.00

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
181:					
Haploxerepts	40	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.50
Purser	30	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (hard) < 40" depth	1.00
		Bedrock (hard) < 20" depth	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	0.10
Rock outcrop	15	Not rated		Not rated	
182:					
Luff	35	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (hard) < 40" depth	1.00
		Shrink-swell (LEP >6)	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Clay from 40 to 60%	0.50
Haploxerepts	30	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
Haploxeralfs	20	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.78	Clay from 40 to 60%	0.50
183:					
Purser	55	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (hard) < 40" depth	1.00
		Bedrock (hard) < 20" depth	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	0.10
Luff	25	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (hard) < 40" depth	1.00
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Shrink-swell (LEP >6)	0.99	Clay from 40 to 60%	0.12
184:					
Dewpoint	45	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (hard) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 15%	1.00
		Shrink-swell (LEP 3-6)	0.78	Clay from 40 to 60%	0.12

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
184:					
Luff	30	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (hard) < 40" depth	1.00
		Shrink-swell (LEP >6)	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	0.10
185:					
Purser, coastal cliffs	65	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (hard) < 40" depth	1.00
		Bedrock (hard) < 20" depth	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	0.10
Rock outcrop, coastal cliffs	20	Not rated		Not rated	
190:					
Typic Xerofluvents	70	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Flooding >= occasional	1.00	Caving potential	1.00
				Frequent or occasional flooding	0.50
Riverwash	15	Not rated		Not rated	
191:					
Typic Haploxerepts	40	Limitations		Limitations	
		Flooding >= occasional	1.00	Caving potential	1.00
				Frequent or occasional flooding	0.50
Typic Xerofluvents	30	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Flooding >= occasional	1.00	Caving potential	1.00
				Frequent or occasional flooding	0.50
Argixerolls	20	Limitations		Limitations	
		Flooding >= occasional	1.00	Caving potential	1.00
				Frequent or occasional flooding	0.50
293:					
Rock outcrop	65	Not rated		Not rated	
Nauti	15	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (soft) from 20 to 40"	0.32
		Shrink-swell (LEP 3-6)	0.50	Caving potential	0.10

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets		Shallow excavations	
		Limitations	Value	Limitations	Value
293:					
Haploxerepts	15	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00
				Caving potential	0.10
400:					
Oboship	40	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
Nauti	25	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (soft) from 20 to 40"	0.32
		Shrink-swell (LEP 3-6)	0.50	Caving potential	0.10
Bosun	20	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
407:					
Nauti	55	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.15
Flyer	15	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.08
Marpol	15	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Bedrock (hard) from 40 to 60"	0.98
		Shrink-swell (LEP 3-6)	0.78	Clay from 40 to 60%	0.50
410:					
Express	35	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.18

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
410:					
Flyer	30	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Bedrock (soft) from 20 to 40"	0.92
				Caving potential	0.10
Loadline	20	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00
				Caving potential	0.10
411:					
Flyer	45	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Bedrock (soft) from 20 to 40"	0.92
				Caving potential	0.10
Loadline	25	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 20" depth	1.00
		Bedrock (soft) < 20" depth	1.00	Slopes > 15%	1.00
				Caving potential	0.10
Nauti	15	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.06	Bedrock (soft) from 20 to 40"	0.08
412:					
Flyer, gullied	30	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Bedrock (soft) from 20 to 40"	0.92
				Caving potential	0.10
Express, gullied	25	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
Bosun	20	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
420:					
Masthead	45	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (soft) from 20 to 40"	0.68
		Shrink-swell (LEP >6)	1.00	Slopes 8 to 15%	0.16
		Slopes 8 to 15%	0.16	Clay from 40 to 60%	0.12
Luff	40	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (soft) from 20 to 40"	0.98
		Shrink-swell (LEP >6)	1.00	Clay from 40 to 60%	0.50
		Slopes 8 to 15%	0.16	Slopes 8 to 15%	0.16
421:					
Masthead	45	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Bedrock (soft) from 20 to 40"	0.68
		Shrink-swell (LEP 3-6)	0.78	Clay from 40 to 60%	0.12
Luff	40	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Shrink-swell (LEP >6)	1.00	Clay from 40 to 60%	0.12
		Slopes > 15%	1.00	Caving potential	0.10
422:					
Dewpoint	40	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.78	Clay from 40 to 60%	0.42
Masthead	25	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.78	Bedrock (soft) from 20 to 40"	0.92
Coastwise	15	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (hard) < 40" depth	1.00
		Bedrock (hard) < 20" depth	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	0.10
423:					
Masthead	40	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.78	Bedrock (soft) from 20 to 40"	0.50

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
423:					
Coastwise	25	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (soft) < 20" depth	1.00
		Slopes > 15%	1.00	Slopes > 15%	1.00
		Bedrock (soft) < 20" depth	1.00	Caving potential	0.10
Dewpoint	20	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.78	Clay from 40 to 60%	0.50
424:					
Masthead	45	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.01	Clay from 40 to 60%	0.50
Dewpoint	30	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	1.00
				Clay from 40 to 60%	0.50
Rock outcrop	15	Not rated		Not rated	
425:					
Coastwise, cobbly	60	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Bedrock (soft) < 20" depth	1.00
		Slopes > 15%	1.00	Slopes > 15%	1.00
		Bedrock (soft) < 20" depth	1.00	Caving potential	0.10
Masthead, cobbly	25	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
		Shrink-swell (LEP 3-6)	0.22	Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.46
427:					
Masthead	40	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
		Slopes > 15%	1.00	Caving potential	1.00
		Shrink-swell (LEP 3-6)	0.78	Bedrock (soft) from 20 to 40"	0.32
Coastwise, cobbly	25	Limitations		Limitations	
		Bedrock (hard) < 20" depth	1.00	Bedrock (hard) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 15%	1.00
		AASHTO GI >8 (low soil strength)	1.00	Caving potential	0.10

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets: Limitations	Value	Shallow excavations: Limitations	Value
427:					
Typic Haploxeralfs	20	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
				Bedrock (soft) from 20 to 40"	0.95
450:					
Urban land	70	Not rated		Not rated	
Xerorthents, landscaped	30	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Ponding (any duration)	1.00
		Ponding (any duration)	1.00	Caving potential	1.00
		Flooding = rare	0.50		
451:					
Nauti, landscaped	55	Limitations		Limitations	
		Slopes > 15%	1.00	Caving potential	1.00
		AASHTO GI >8 (low soil strength)	1.00	Slopes > 15%	1.00
				Bedrock (soft) from 20 to 40"	0.32
Urban land	30	Not rated		Not rated	
453:					
Typic Argixerolls	70	Limitations		Limitations	
		AASHTO GI >8 (low soil strength)	1.00	Clay from 40 to 60%	0.88
		Shrink-swell (LEP 3-6)	0.01	Caving potential	0.10
Urban land, landscaped	15	Not rated		Not rated	
454:					
Typic Argixerolls, landscaped	50	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Flooding = rare	0.50	Caving potential	1.00
Calcic Haploxerolls, landscaped	25	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Flooding = rare	0.50	Caving potential	1.00
Urban land, landscaped	15	Not rated		Not rated	

Table 4b.--Building Site Development--Continued

Map symbol and component name	Pct. of map unit	Local roads and streets		Shallow excavations	
		Limitations	Value	Limitations	Value
456:					
Typic Xerorthents, fill	60	No limitations		Limitations	
				Caving potential	1.00
Typic Xerorthents, steep fill	25	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00
				Caving potential	1.00
DAM:					
Dam	100	Not rated		Not rated	
GP:					
Gravel pits	100	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	

The interpretation for local roads and streets evaluates the following soil properties at variable depths in the soil: flooding, ponding, wetness, slope, organic Unified classes for low soil strength (PT, OL, and OH), amount of clay, depth to hard or soft bedrock, depth to a thick or thin cemented pan, fragments more than 3 inches in size, soil bulk density, and the caving potential of the soil.

The interpretation for shallow excavations evaluates the following soil properties at variable depths in the soil: flooding, ponding, wetness, slope, subsidence of organic soils, shrink-swell potential expressed as linear extensibility percent (LEP), potential for frost action, depth to hard or soft bedrock, depth to a thick or thin cemented pan, fragments more than 3 inches in size, and soil strength expressed as the AASHTO group index number (AASHTO GI).

Table 5a.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Limitations	Value	Limitations	Value
156:					
Tongva----------------------------	40	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Permeability .6-2"/hr (some seepage)	0.50
Freeboard-------------------------	30	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
		Slopes > 15%	1.00	Bedrock (soft) from 40 to 60"	0.32
		Depth to bedrock 40-72"	0.73		
Starbright------------------------	15	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
		Slopes > 15%	1.00	Bedrock (soft) from 40 to 60"	0.92
		Depth to bedrock 40-72"	0.97		
157:					
Tongva----------------------------	40	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
		Permeability < .6"/hr in 24-60" (slow perc)	1.00		
Pachic Argixerolls----------------	30	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Depth to bedrock < 40"	1.00		
Freeboard-------------------------	15	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
		Slopes > 15%	1.00	Bedrock (soft) from 40 to 60"	0.92
		Depth to bedrock 40-72"	0.97		

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
160:					
Beaches	75	Not rated		Not rated	
Abaft	15	Limitations		Limitations	
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
		Permeability > 6"/hr in 24-60" (seepage and poor filter)	1.00		
181:					
Haploxerepts	40	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
Purser	30	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (hard) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Rock outcrop	15	Not rated		Not rated	
182:					
Luff	35	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (hard) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		
Haploxerepts	30	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 40 to 60"	0.98
		Slopes > 15%	1.00		
		Depth to bedrock 40-72"	0.99		
Haploxeralfs	20	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Permeability < .6"/hr in 24-60" (slow perc)	1.00		

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
183:					
Purser	55	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (hard) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Luff	25	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (hard) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
				Permeability .6-2"/hr (some seepage)	0.50
184:					
Dewpoint	45	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (hard) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		
Luff	30	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (hard) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
185:					
Purser, coastal cliffs	65	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (hard) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Rock outcrop, coastal cliffs	20	Not rated		Not rated	
190:					
Typic Xerofluvents	70	Limitations		Limitations	
		Flooding	1.00	Ponding (any duration)	1.00
		Ponding (any duration)	1.00	Flooding >= occasional	1.00
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
Riverwash	15	Not rated		Not rated	

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
191:					
Typic Haploxerepts	40	Limitations		Limitations	
		Flooding	1.00	Flooding >= occasional	1.00
		Permeability .6-2"/hr (slow perc)	0.32	Permeability > 2"/hr (seepage)	1.00
				Slopes 2 to 8%	0.50
Typic Xerofluvents	30	Limitations		Limitations	
		Flooding	1.00	Ponding (any duration)	1.00
		Ponding (any duration)	1.00	Flooding >= occasional	1.00
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
Argixerolls	20	Limitations		Limitations	
		Flooding	1.00	Flooding >= occasional	1.00
		Permeability .6-2"/hr (slow perc)	0.32	Permeability > 2"/hr (seepage)	1.00
				Slopes 2 to 8%	0.50
293:					
Rock outcrop	65	Not rated		Not rated	
Nauti	15	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		
Haploxerepts	15	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability .6-2"/hr (some seepage)	0.68
400:					
Oboship	40	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Permeability .6-2"/hr (slow perc)	0.50	Permeability .6-2"/hr (some seepage)	0.50
		Depth to bedrock 40-72"	0.25		
Nauti	25	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
400:					
Bosun	20	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Depth to bedrock 40-72"	0.88	Permeability > 2"/hr (seepage)	1.00
		Permeability .6-2"/hr (slow perc)	0.50	Bedrock (soft) from 40 to 60"	0.68
407:					
Nauti	55	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Depth to bedrock < 40"	1.00		
Flyer	15	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
		Permeability .6-2"/hr (slow perc)	0.50	Permeability > 2"/hr (seepage)	1.00
Marpol	15	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
		Slopes > 15%	1.00	Bedrock (hard) from 40 to 60"	0.98
		Depth to bedrock 40-72"	0.99		
410:					
Express	35	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
Flyer	30	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability .6-2"/hr (some seepage)	0.50
Loadline	20	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability > 2"/hr (seepage)	1.00

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
411:					
Flyer	45	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability .6-2"/hr (some seepage)	0.50
Loadline	25	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability > 2"/hr (seepage)	1.00
Nauti	15	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00	Permeability .6-2"/hr (some seepage)	0.05
		Depth to bedrock < 40"	1.00		
412:					
Flyer, gullied	30	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability .6-2"/hr (some seepage)	0.50
Express, gullied	25	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
		Depth to bedrock 40-72"	0.99	Bedrock (soft) from 40 to 60"	0.98
Bosun	20	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Depth to bedrock 40-72"	0.97	Bedrock (soft) from 40 to 60"	0.92
		Permeability .6-2"/hr (slow perc)	0.50	Permeability .6-2"/hr (some seepage)	0.50
420:					
Masthead	45	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Depth to bedrock < 40"	1.00		
		Slopes 8 to 15%	0.16		

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
420:					
Luff	40	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Slopes > 8%	1.00
		Slopes 8 to 15%	0.16		
421:					
Masthead	45	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Depth to bedrock < 40"	1.00		
		Slopes > 15%	1.00		
Luff	40	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
				Bedrock (soft) from 40 to 60"	0.68
		Slopes > 15%	1.00		
		Depth to bedrock 40-72"	0.88		
422:					
Dewpoint	40	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		
Masthead	25	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Coastwise	15	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (hard) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields: Limitations	Value	Sewage lagoons: Limitations	Value
423:					
Masthead	40	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		
Coastwise	25	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Dewpoint	20	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00	Permeability .6-2"/hr (some seepage)	0.50
		Depth to bedrock < 40"	1.00		
424:					
Masthead	45	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
		Slopes > 15%	1.00		
Dewpoint	30	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00	Permeability .6-2"/hr (some seepage)	0.50
		Depth to bedrock < 40"	1.00		
Rock outcrop	15	Not rated		Not rated	
425:					
Coastwise, cobbly	60	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Masthead, cobbly	25	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Limitations	Value	Limitations	Value
427:					
Masthead	40	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Slopes > 15%	1.00		
		Depth to bedrock < 40"	1.00		
Coastwise, cobbly	25	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (hard) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00		
Typic Haploxeralfs	20	Limitations		Limitations	
		Depth to bedrock < 40"	1.00	Bedrock (soft) < 40" depth	1.00
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Restricted permeability due to bedrock or hardpan	1.00	Permeability .6-2"/hr (some seepage)	0.50
450:					
Urban land	70	Not rated		Not rated	
Xerorthents, landscaped	30	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes 2 to 8%	0.50
				Flooding = rare	0.50
		Seepage in bottom layer	1.00		
451:					
Nauti, landscaped	55	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Bedrock (soft) < 40" depth	1.00
				Slopes > 8%	1.00
		Depth to bedrock < 40"	1.00		
		Slopes > 15%	1.00		
Urban land	30	Not rated		Not rated	
453:					
Typic Argixerolls	70	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes 2 to 8%	0.50
Urban land, landscaped	15	Not rated		Not rated	

Table 5a.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Limitations	Value	Limitations	Value
454:					
Typic Argixerolls, landscaped-----	50	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Permeability .6-2"/hr (slow perc)	0.50	Permeability .6-2"/hr (some seepage)	0.50
		Rare flooding	0.40	Flooding = rare	0.50
Calcic Haploxerolls, landscaped---	25	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
		Permeability .6-2"/hr (slow perc)	0.50	Flooding = rare	0.50
Urban land, landscaped------------	15	Not rated		Not rated	
456:					
Typic Xerorthents, fill-----------	60	Limitations		Limitations	
		Permeability .6-2"/hr (slow perc)	0.50	Permeability .6-2"/hr (some seepage)	0.50
Typic Xerorthents, steep fill-----	25	Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 8%	1.00
		Permeability .6-2"/hr (slow perc)	0.50	Permeability .6-2"/hr (some seepage)	0.50
DAM:					
Dam------------------------------	100	Not rated		Not rated	
GP:					
Gravel pits----------------------	100	Not rated		Not rated	
W:					
Water----------------------------	100	Not rated		Not rated	

The interpretation for septic tank absorption fields evaluates the following soil properties at variable 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 rapid, allowing seepage; and permeability that is too slow or an impermeable layer at a shallow depth.

The interpretation for sewage lagoons evaluates the following soil properties at variable depths in the soil: flooding, ponding, wetness, slope, organic Unified classes for low strength (PT, OL, and OH), depth to hard or soft bedrock, depth to a cemented pan, fragments more than 3 inches in size, and permeability that is too rapid, allowing seepage.

Table 5b.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
156:							
Tongva	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay loam, silty clay, silty clay loam	0.50			Silt or clay textures from 10-60"	0.50
Freeboard	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth from 40-60"	0.32	Packing (OL, OH, CH, or MH)	1.00
						Depth to bedrock from 40-60"	0.32
Starbright	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
157:							
Tongva	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay loam, silty clay, silty clay loam	0.50			Silt or clay textures from 10-60"	0.50
Pachic Argixerolls	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Fragments (<75mm) > 50%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
						Slopes > 15%	1.00

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill: Limitations	Value	Area sanitary landfill: Limitations	Value	Daily cover for landfill: Limitations	Value
157:							
Freeboard	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth from 40-60"	0.92	Packing (OL, OH, CH, or MH)	1.00
		Clay loam, silty clay, silty clay loam	0.50			Depth to bedrock from 40-60"	0.92
160:							
Beaches	75	Not rated		Not rated		Not rated	
Abaft	15	Limitations		Limitations		Limitations	
		Seepage in bottom layer	1.00	Seepage in 20-40" depth	1.00	Permeability > 2.0 in/hr	1.00
		Sandy textures	0.50			Sandy textures	0.50
181:							
Haploxerepts	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Seepage in bottom layer	1.00	Seepage in 20-40" depth	1.00	Fragments (<75mm) > 50%	0.99
Purser	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay loam, silty clay, silty clay loam	0.50			Packing (OL, OH, CH, or MH)	1.00
Rock outcrop	15	Not rated		Not rated		Not rated	
182:							
Luff	35	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
Haploxerepts	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Fragments (<75mm) > 50%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth from 40-60"	0.98	Slopes > 15%	1.00
						Depth to bedrock from 40-60"	0.98

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill: Limitations	Value	Area sanitary landfill: Limitations	Value	Daily cover for landfill: Limitations	Value
182:							
Haploxeralfs------------	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Clay loam, silty clay, silty clay loam	0.50			Silt or clay textures from 10-60"	0.50
						Clay loam, silty clay, silty clay loam	0.50
183:							
Purser------------------	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
Luff--------------------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00			Packing (OL, OH, CH, or MH)	1.00
184:							
Dewpoint----------------	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
Luff--------------------	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
185:							
Purser, coastal cliffs--	65	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
Rock outcrop, coastal cliffs-----------------	20	Not rated		Not rated		Not rated	

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
190:							
Typic Xerofluvents------	70	Limitations		Limitations		Limitations	
		Flooding >= occasional	1.00	Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Ponding (any duration)	1.00	Seepage in 20-40" depth	1.00	Sandy textures	1.00
		Sandy textures	1.00	Frequent flooding	0.80	Permeability > 2.0 in/hr	1.00
Riverwash---------------	15	Not rated		Not rated		Not rated	
191:							
Typic Haploxerepts------	40	Limitations		Limitations		Limitations	
		Flooding >= occasional	1.00	Seepage in 20-40" depth	1.00	Permeability > 2.0 in/hr	1.00
		Sandy textures	0.50	Occasional flooding	0.60	Sandy textures	0.50
Typic Xerofluvents------	30	Limitations		Limitations		Limitations	
		Flooding >= occasional	1.00	Ponding (any duration)	1.00	Ponding (any duration)	1.00
		Ponding (any duration)	1.00	Seepage in 20-40" depth	1.00	Sandy textures	1.00
		Sandy textures	1.00	Occasional flooding	0.60	Permeability > 2.0 in/hr	1.00
Argixerolls-------------	20	Limitations		Limitations		Limitations	
		Flooding >= occasional	1.00	Occasional flooding	0.60	Fragments (<75mm) 25-50%	0.15
293:							
Rock outcrop------------	65	Not rated		Not rated		Not rated	
Nauti-------------------	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Packing (OL, OH, CH, or MH)	1.00
		Clay loam, silty clay, silty clay loam	0.50			Depth to bedrock < 40"	1.00
Haploxerepts------------	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
400:							
Oboship-----------------	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00			Fragments (<75mm) 25-50%	0.90
		Fragments (3-10") 15-35%	0.01				

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill: Limitations	Value	Area sanitary landfill: Limitations	Value	Daily cover for landfill: Limitations	Value
400:							
Nauti	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
						Silt or clay textures from 10-60"	0.50
		Clay loam, silty clay, silty clay loam	0.50				
Bosun	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth from 40-60"	0.68	Fragments (<75mm) 25-50%	0.80
						Depth to bedrock from 40-60"	0.68
407:							
Nauti	55	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
						Silt or clay textures from 10-60"	0.50
		Clay loam, silty clay, silty clay loam	0.50				
Flyer	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
						Fragments (<75mm) 25-50%	0.88
Marpol	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth from 40-60"	0.98	Silty clay or clay 10-60"	1.00
						Packing (OL, OH, CH, or MH)	1.00
		Clay or silty clay	1.00				
410:							
Express	35	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Seepage in 20-40" depth	1.00	Depth to bedrock < 40"	1.00
				Bedrock depth < 40"	1.00	Permeability > 2.0 in/hr	0.50
		Seepage in bottom layer	1.00				
Flyer	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill: Limitations	Value	Area sanitary landfill: Limitations	Value	Daily cover for landfill: Limitations	Value
410:							
Loadline	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Permeability > 2.0 in/hr	0.50
		Seepage in bottom layer	1.00				
411:							
Flyer	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
Loadline	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Permeability > 2.0 in/hr	0.50
		Seepage in bottom layer	1.00				
Nauti	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
						Silt or clay textures from 10-60"	0.50
		Clay loam, silty clay, silty clay loam	0.50				
412:							
Flyer, gullied	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
Express, gullied	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Seepage in 20-40" depth	1.00	Depth to bedrock from 40-60"	0.98
				Bedrock depth from 40-60"	0.98		
						Permeability > 2.0 in/hr	0.50
Bosun	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth from 40-60"	0.92	Fragments (<75mm) > 50%	0.99
						Depth to bedrock from 40-60"	0.92

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
420:							
Masthead	45	Limitations		Limitations		Limitations	
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
		Clay or silty clay	1.00	Slopes 8 to 15%	0.16	Silty clay or clay 10-60"	1.00
		Slopes 8 to 15%	0.16			Packing (OL, OH, CH, or MH)	1.00
Luff	40	Limitations		Limitations		Limitations	
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
		Clay or silty clay	1.00	Slopes 8 to 15%	0.16	Silty clay or clay 10-60"	1.00
		Slopes 8 to 15%	0.16			Packing (OL, OH, CH, or MH)	1.00
421:							
Masthead	45	Limitations		Limitations		Limitations	
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Depth to bedrock < 40"	1.00
		Clay or silty clay	1.00	Slopes > 15%	1.00	Silty clay or clay 10-60"	1.00
		Slopes > 15%	1.00			Packing (OL, OH, CH, or MH)	1.00
Luff	40	Limitations		Limitations		Limitations	
		Lithic or paralithic bedrock < 72"	1.00	Slopes > 15%	1.00	Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00	Bedrock depth from 40-60"	0.68	Packing (OL, OH, CH, or MH)	1.00
		Slopes > 15%	1.00			Clay or silty clay	1.00
422:							
Dewpoint	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
Masthead	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
Coastwise	15	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
423:							
Masthead	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00				
Coastwise	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00				
Dewpoint	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00				
424:							
Masthead	45	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
						Packing (OL, OH, CH, or MH)	1.00
Dewpoint	30	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00				
Rock outcrop	15	Not rated		Not rated		Not rated	
425:							
Coastwise, cobbly	60	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00				
Masthead, cobbly	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00				

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
427:							
Masthead----------------	40	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Silty clay or clay 10-60"	1.00
		Clay or silty clay	1.00				
Coastwise, cobbly-------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Packing (OL, OH, CH, or MH)	1.00
		Clay loam, silty clay, silty clay loam	0.50				
Typic Haploxeralfs------	20	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Depth to bedrock < 40"	1.00
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Slopes > 15%	1.00
						Fragments (<75mm) 25-50%	0.48
450:							
Urban land--------------	70	Not rated		Not rated		Not rated	
Xerorthents, landscaped	30	Limitations		No limitations		Limitations	
		Seepage in bottom layer	1.00			Silt or clay textures from 10-60"	0.50
		Clay loam, silty clay, silty clay loam	0.50			Clay loam, silty clay, silty clay loam	0.50
451:							
Nauti, landscaped-------	55	Limitations		Limitations		Limitations	
		Lithic or paralithic bedrock < 72"	1.00	Bedrock depth < 40"	1.00	Silty clay or clay 10-60"	1.00
				Slopes > 15%	1.00	Clay or silty clay	1.00
		Clay or silty clay	1.00			Depth to bedrock < 40"	1.00
		Slopes > 15%	1.00				
Urban land--------------	30	Not rated		Not rated		Not rated	
453:							
Typic Argixerolls-------	70	Limitations		No limitations		Limitations	
		Clay or silty clay	1.00			Silty clay or clay 10-60"	1.00
						Clay or silty clay	1.00
Urban land, landscaped--	15	Not rated		Not rated		Not rated	

Table 5b.--Sanitary Facilities--Continued

Map symbol and component name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Limitations	Value	Limitations	Value	Limitations	Value
454:							
Typic Argixerolls, landscaped------------	50	No limitations		No limitations		Limitations	
						Fragments (<75mm) 25-50%	0.01
Calcic Haploxerolls, landscaped------------	25	Limitations		Limitations		No limitations	
		Seepage in bottom layer	1.00	Seepage in 20-40" depth	1.00		
Urban land, landscaped--	15	Not rated		Not rated		Not rated	
456:							
Typic Xerorthents, fill	60	No limitations		No limitations		Limitations	
						Fragments (<75mm) 25-50%	0.92
Typic Xerorthents, steep fill------------------	25	Limitations		Limitations		Limitations	
		Slopes > 15%	1.00	Slopes > 15%	1.00	Slopes > 15%	1.00
						Fragments (<75mm) 25-50%	0.97
DAM:							
Dam--------------------	100	Not rated		Not rated		Not rated	
GP:							
Gravel pits------------	100	Not rated		Not rated		Not rated	
W:							
Water------------------	100	Not rated		Not rated		Not rated	

The interpretation for trench sanitary landfill evaluates the following soil properties at variable 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 size, sodium content (SAR), pH, clayey or sandy textures, and permeability that is too rapid, allowing seepage in some climates.

The interpretation for area sanitary landfill evaluates the following soil properties at variable depths in the soil: flooding, ponding, wetness, slope, depth to bedrock, depth to a cemented pan, and permeability that is too rapid, allowing seepage in some climates.

The interpretation for daily cover for landfill evaluates the following soil properties at variable depths in the soil: ponding, wetness, slope, depth to bedrock, depth to a cemented pan, fragments more than or less than 3 inches in size, Unified class for peat (PT), Unified classes for packing (OL, OH, CH, and MH), sandy or clayey textures, pH, carbonates, sodium content (SAR), salinity (EC), soil climate, kaolinitic mineralogy, and permeability that is too rapid, allowing seepage.

Table 6a.--Construction Materials

(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 0.00, the greater the limitation. A value of 0.00 indicates an absolute limitation based on the soil property criteria used to develop the interpretation. Values closer to 1.00 indicate lesser limitations. Limiting features with values of 1.00 have absolutely no limitation and are not shown in the table. Rating classes are determined by the most limiting value. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limiting features is given at the end of the table)

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
156:							
Tongva	40	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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	0.18
						Depth to bedrock 20 to 40"	0.50
Freeboard	30	Fair source		Poor source		Poor source	
		Thickest layer a possible source	0.14	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.35	Thickest layer not a source	0.00	Hard to reclaim	0.00
Starbright	15	Poor source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock 20 to 40"	0.70
157:							
Tongva	40	Poor source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Depth to bedrock 20 to 40"	0.32
Pachic Argixerolls	30	Fair source		Fair source		Poor source	
		Thickest layer a possible source	0.29	Bottom layer is a possible source	0.05	Slope > 15%	0.00
						Rock fragment content	0.00
		Bottom layer a possible source	0.60	Thickest layer a possible source	0.05	Depth to bedrock 20 to 40"	0.80
Freeboard	15	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay 27 to 40%	0.02

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
160:							
Beaches	75	Not rated		Not rated		Not rated	
Abaft	15	Poor source		Fair source		Fair source	
		Bottom layer not a source	0.00	Bottom layer a possible source	0.08	Sand fractions 75-85%	0.18
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer a possible source	0.08		
181:							
Haploxerepts	40	Fair source		Fair source		Poor source	
		Thickest layer a possible source	0.10	Thickest layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.28	Bottom layer a possible source	0.07	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.90
Purser	30	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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
						Clay > 40%	0.00
						Rock fragment content	0.08
Rock outcrop	15	Not rated		Not rated		Not rated	
182:							
Luff	35	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock 20 to 40"	0.30
Haploxerepts	30	Fair source		Fair source		Poor source	
		Thickest layer a possible source	0.03	Thickest layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.74	Bottom layer a possible source	0.07	Hard to reclaim	0.00
						Rock fragment content	0.00
Haploxeralfs	20	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Hard to reclaim	0.95

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
183:							
Purser------------------	55	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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
						Clay > 40%	0.00
						Rock fragment content	0.08
Luff--------------------	25	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock 20 to 40"	0.80
184:							
Dewpoint----------------	45	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock 20 to 40"	0.46
Luff--------------------	30	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.00
185:							
Purser, coastal cliffs--	65	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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
						Clay 27 to 40%	0.50
Rock outcrop, coastal cliffs-----------------	20	Not rated		Not rated		Not rated	
190:							
Typic Xerofluvents------	70	Fair source		Fair source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer a possible source	0.02	Hard to reclaim	0.00
		Bottom layer a possible source	0.09	Bottom layer a possible source	0.09	Rock fragment content	0.82
Riverwash---------------	15	Not rated		Not rated		Not rated	

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
191:							
Typic Haploxerepts	40	Poor source		Fair source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Sand fractions > 85%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer a possible source	0.08		
Typic Xerofluvents	30	Fair source		Fair source		Poor source	
		Thickest layer a possible source	0.15	Bottom layer a possible source	0.37	Sand fractions > 85%	0.00
						Rock fragment content	0.00
		Bottom layer a possible source	0.18	Thickest layer a possible source	0.37	Hard to reclaim	0.00
Argixerolls	20	Poor source		Poor source		Poor source	
		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		
293:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Nauti	15	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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"	0.60
						Rock fragment content	0.68
Haploxerepts	15	Poor source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
				Thickest layer not a source	0.00	Depth to bedrock < 20"	0.00
		Bottom layer not a source	0.00			Rock fragment content	0.00
400:							
Oboship	40	Fair source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
				Thickest layer not a source	0.00	Hard to reclaim	0.00
		Bottom layer a possible source	0.11			Rock fragment content	0.00
Nauti	25	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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"	0.60
						Rock fragment content	0.68

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
400:							
Bosun	20	Fair source		Poor source		Poor source	
		Thickest layer a possible source	0.11	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.11	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.12
407:							
Nauti	55	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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"	0.72
						Rock fragment content	0.76
						Clay 27 to 40%	0.92
Flyer	15	Fair source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.40	Thickest layer not a source	0.00	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.80
Marpol	15	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
410:							
Express	35	Poor source		Fair source		Poor source	
		Bottom layer not a source	0.00	Thickest layer a possible source	0.04	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer a possible source	0.07	Sand fractions 75-85%	0.47
						Depth to bedrock 20 to 40"	0.70
						Rock fragment content	0.88
Flyer	30	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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"	0.20
Loadline	20	Poor source		Fair source		Poor source	
		Bottom layer not a source	0.00	Thickest layer a possible source	0.01	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer a possible source	0.04	Depth to bedrock < 20"	0.00
						Rock fragment content	0.76

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
411:							
Flyer	45	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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"	0.20
Loadline	25	Poor source		Fair source		Poor source	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer a possible source	0.03	Depth to bedrock < 20"	0.00
Nauti	15	Poor source		Fair source		Poor source	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer a possible source	0.03	Depth to bedrock 20 to 40"	0.80
412:							
Flyer, gullied	30	Poor source		Fair source		Poor source	
		Bottom layer not a source	0.00	Thickest layer a possible source	0.09	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00			Depth to bedrock 20 to 40"	0.20
				Bottom layer a possible source	0.09	Sand fractions 75-85%	0.22
Express, gullied	25	Fair source		Fair source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer a possible source	0.03	Slope > 15%	0.00
						Hard to reclaim	0.00
		Bottom layer a possible source	0.30	Bottom layer a possible source	0.10	Rock fragment content	0.18
Bosun	20	Fair source		Fair source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope > 15%	0.00
				Bottom layer a possible source	0.03	Hard to reclaim	0.00
		Bottom layer a possible source	0.54			Rock fragment content	0.00
420:							
Masthead	45	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay > 40%	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"	0.40
						Slope 8 to 12%	0.84
Luff	40	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay > 40%	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"	0.10
						Slope 8 to 12%	0.84

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
421:							
Masthead	45	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay > 40%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope > 15%	0.00
						Depth to bedrock 20 to 40"	0.40
Luff	40	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay > 40%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Slope > 15%	0.00
						Rock fragment content	0.76
422:							
Dewpoint	40	Poor source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Rock fragment content	0.32
						Depth to bedrock 20 to 40"	0.70
Masthead	25	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock 20 to 40"	0.20
Coastwise	15	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock < 20"	0.00
423:							
Masthead	40	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.50
Coastwise	25	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock < 20"	0.00
Dewpoint	20	Poor source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock 20 to 40"	0.50
						Rock fragment content	0.59

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel: Rating class and limiting features	Value	Potential as source of sand: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value
424:							
Masthead	45	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Hard to reclaim	0.99
Dewpoint	30	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.80
Rock outcrop	15	Not rated		Not rated		Not rated	
425:							
Coastwise, cobbly	60	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00	Clay > 40%	0.00
						Depth to bedrock < 20"	0.00
Masthead, cobbly	25	Fair source		Poor source		Poor source	
		Thickest layer a possible source	0.09	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.62	Thickest layer not a source	0.00	Clay > 40%	0.00
						Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.52
427:							
Masthead	40	Fair source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.68	Thickest layer not a source	0.00	Clay > 40%	0.00
						Rock fragment content	0.59
						Depth to bedrock 20 to 40"	0.60
Coastwise, cobbly	25	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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
						Clay 27 to 40%	0.18
Typic Haploxeralfs	20	Fair source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
		Bottom layer a possible source	0.05	Thickest layer not a source	0.00	Rock fragment content	0.00
						Depth to bedrock 20 to 40"	0.16

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel		Potential as source of sand		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
450:							
Urban land--------------	70	Not rated		Not rated		Not rated	
Xerorthents, landscaped	30	Poor source		Good source		Good source	
		Bottom layer not a source	0.00	Bottom layer a possible source	0.10		
		Thickest layer not a source due to fines or thin layer	0.00				
451:							
Nauti, landscaped-------	55	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope > 15%	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	0.04
						Depth to bedrock 20 to 40"	0.60
Urban land--------------	30	Not rated		Not rated		Not rated	
453:							
Typic Argixerolls-------	70	Poor source		Poor source		Poor source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Clay > 40%	0.00
		Thickest layer not a source due to fines or thin layer	0.00	Thickest layer not a source	0.00		
Urban land, landscaped--	15	Not rated		Not rated		Not rated	
454:							
Typic Argixerolls, landscaped------------	50	Poor source		Fair source		Poor source	
		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 a possible source	0.05		
Calcic Haploxerolls, landscaped------------	25	Poor source		Fair source		Good source	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00		
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer a possible source	0.07		
Urban land, landscaped--	15	Not rated		Not rated		Not rated	

Table 6a.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of gravel		Potential as source of sand		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
456:							
Typic Xerorthents, fill	60	Poor source		Poor source		Poor source	
		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
Typic Xerorthents, steep fill-------------------	25	Poor source		Poor source		Poor source	
		Thickest layer not a source due to fines or thin layer	0.00	Bottom layer not a source	0.00	Slope > 15%	0.00
				Thickest layer not a source	0.00	Rock fragment content	0.00
		Bottom layer not a source	0.00			Hard to reclaim	0.00
DAM:							
Dam---------------------	100	Not rated		Not rated		Not rated	
GP:							
Gravel pits-------------	100	Not rated		Not rated		Not rated	
W:							
Water-------------------	100	Not rated		Not rated		Not rated	

The interpretation for gravel evaluates coarse fragments more than .2 inch in size in the bottom or thickest layer of the soil.

The interpretation for sand evaluates the amount of sand and fine gravels in the thickest or bottom layer of the soil. Organic soil layers with a Unified engineering class for peat (PT) also are evaluated.

The interpretation for topsoil evaluates the following soil properties at various depths: calcium carbonates, clay content, bulk density, sand content, soil wetness, coarse fragments .2 inch to more than 3 inches in size, content of organic matter (OM), sodium content expressed as the sodium adsorption ratio (SAR), salinity expressed as dS/m of electrical conductivity (EC), depth to bedrock, slope, and pH.

Table 6b.--Construction Materials

(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 0.00, the greater the limitation. A value of 0.00 indicates an absolute limitation based on the soil property criteria used to develop the interpretation. Values closer to 1.00 indicate lesser limitations. Limiting features with values of 1.00 have absolutely no limitation and are not shown in the table. Rating classes are determined by the most limiting value. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limiting features is given at the end of the table)

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
156:					
Tongva	40	Fair source		Poor source	
		pH between 4 and 6.5 above 40"	0.60	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.72	Slopes > 25%	0.00
				AASHTO GIN 5 to 8 (soil strength)	0.78
Freeboard	30	Poor source		Poor source	
		Maximum pH > 8.5	0.00	Slopes > 25%	0.00
		OM .5 to 1%	0.01	LEP 3 to 9	0.44
				Depth to bedrock 40 to 60"	0.68
Starbright	15	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.41	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.80	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.64
157:					
Tongva	40	Poor source		Poor source	
		OM < .5%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.14	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.60	AASHTO GIN > 8 (low soil strength)	0.00
Pachic Argixerolls	30	Fair source		Poor source	
		AWC 3 - 6" to 60" depth	0.56	Depth to bedrock < 40"	0.00
				Slopes > 25%	0.00
				LEP 3 to 9	0.67
Freeboard	15	Poor source		Poor source	
		OM < .5%	0.00	Slopes > 25%	0.00
		Clay 27 to 40%	0.02	AASHTO GIN > 8 (low soil strength)	0.00
		pH between 4 and 6.5 above 40"	0.80	Depth to bedrock 40 to 60"	0.08
		AWC 3 - 6" to 60" depth	0.93	LEP 3 to 9	0.20

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
160:					
Beaches	75	Not rated		Not rated	
Abaft	15	Poor source		Good source	
		WEG = 1 or 2	0.00		
		OM < .5%	0.00		
		AWC 3 - 6" to 60" depth	0.32		
		Sand fractions 75 to 85%	0.41		
181:					
Haploxerepts	40	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		OM < .5%	0.00	Slopes > 25%	0.00
Purser	30	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		OM < .5%	0.00	Slopes > 25%	0.00
		Clay > 40%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.67
Rock outcrop	15	Not rated		Not rated	
182:					
Luff	35	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		OM < .5%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		AWC 3 - 6" to 60" depth	0.01	LEP 3 to 9	0.38
				Slopes 15 to 25%	0.50
Haploxerepts	30	Poor source		Poor source	
		WEG = 1 or 2	0.00	Slopes > 25%	0.00
		AWC 3 - 6" to 60" depth	0.39	Depth to bedrock 40 to 60"	0.02
Haploxeralfs	20	Poor source		Poor source	
		WEG = 1 or 2	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		Clay > 40%	0.00	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.96	LEP 3 to 9	0.67

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
183:					
Purser	55	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		OM < .5%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		Clay > 40%	0.00	Slopes > 25%	0.00
				LEP 3 to 9	0.67
Luff	25	Poor source		Poor source	
		Clay > 40%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		pH between 4 and 6.5 above 40"	0.52	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.53	Slopes > 25%	0.00
				LEP 3 to 9	0.41
184:					
Dewpoint	45	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		OM < .5%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		AWC 3 - 6" to 60" depth	0.10	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.80	LEP 3 to 9	0.62
Luff	30	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.00	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.84	AASHTO GIN > 8 (low soil strength)	0.00
		K factor < .10	0.99	LEP 3 to 9	0.25
185:					
Purser, coastal cliffs	65	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		OM < .5%	0.00	Slopes > 25%	0.00
		Clay 27 to 40%	0.50	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.67
Rock outcrop, coastal cliffs	20	Not rated		Not rated	
190:					
Typic Xerofluvents	70	Fair source		Good source	
		pH between 4 and 6.5 above 40"	0.80		
Riverwash	15	Not rated		Not rated	

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
191:					
Typic Haploxerepts	40	Poor source		Good source	
		Sand fractions > 85%	0.00		
		WEG = 1 or 2	0.00		
		pH between 4 and 6.5 above 40"	0.84		
Typic Xerofluvents	30	Poor source		Good source	
		Sand fractions > 85%	0.00		
		WEG = 1 or 2	0.00		
		OM < .5%	0.00		
		pH between 4 and 6.5 above 40"	0.80		
Argixerolls	20	Poor source		Good source	
		WEG = 1 or 2	0.00		
		OM < .5%	0.00		
293:					
Rock outcrop	65	Not rated		Not rated	
Nauti	15	Fair source		Poor source	
		AWC 3 - 6" to 60" depth	0.67	Slopes > 25%	0.00
		K factor < .10	0.99	Depth to bedrock < 40"	0.00
				AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.75
Haploxerepts	15	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		K factor .10 -.35	0.90	Slopes > 25%	0.00
400:					
Oboship	40	Fair source		Poor source	
		pH between 4 and 6.5 above 40"	0.84	Slopes > 25%	0.00
Nauti	25	Fair source		Poor source	
		AWC 3 - 6" to 60" depth	0.67	Slopes > 25%	0.00
		K factor < .10	0.99	Depth to bedrock < 40"	0.00
				AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.75
Bosun	20	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Slopes > 25%	0.00
				Depth to bedrock 40 to 60"	0.32

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
407:					
Nauti	55	Poor source		Poor source	
		OM < .5%	0.00	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.84	AASHTO GIN > 8 (low soil strength)	0.00
		AWC 3 - 6" to 60" depth	0.87	Depth to bedrock < 40"	0.00
		K factor .10 -.35	0.90	LEP 3 to 9	0.75
		Clay 27 to 40%	0.92		
Flyer	15	Poor source		Poor source	
		WEG = 1 or 2	0.00	Slopes > 25%	0.00
		OM < .5%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.08	LEP 3 to 9	0.81
		pH between 4 and 6.5 above 40"	0.56		
Marpol	15	Poor source		Poor source	
		Clay > 40%	0.00	Slopes > 25%	0.00
		OM .5 to 1%	0.32	AASHTO GIN > 8 (low soil strength)	0.00
		K factor < .10	0.99	Depth to bedrock 40 to 60"	0.02
				LEP 3 to 9	0.83
410:					
Express	35	Poor source		Poor source	
		OM < .5%	0.00	Slopes > 25%	0.00
		AWC 3 - 6" to 60" depth	0.19	Depth to bedrock < 40"	0.00
		K factor .10 -.35	0.68		
		Sand fractions 75 to 85%	0.85		
		pH between 4 and 6.5 above 40"	0.92		
Flyer	30	Fair source		Poor source	
		AWC 3 - 6" to 60" depth	0.07	Slopes > 25%	0.00
		K factor .10 -.35	0.37	Depth to bedrock < 40"	0.00
		pH between 4 and 6.5 above 40"	0.80		
Loadline	20	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
				Slopes > 25%	0.00
411:					
Flyer	45	Fair source		Poor source	
		AWC 3 - 6" to 60" depth	0.07	Depth to bedrock < 40"	0.00
		K factor .10 -.35	0.37	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.80		

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
411:					
Loadline	25	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		K factor .10 -.35	0.90	Slopes > 25%	0.00
Nauti	15	Poor source		Poor source	
		OM < .5%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		K factor .10 -.35	0.37	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.93	Slopes > 25%	0.00
				LEP < 3	0.99
412:					
Flyer, gullied	30	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		OM < .5%	0.00	Slopes > 25%	0.00
		Sand fractions 75 to 85%	0.50		
		pH between 4 and 6.5 above 40"	0.80		
Express, gullied	25	Fair source		Poor source	
		AWC 3 - 6" to 60" depth	0.02	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.92	Depth to bedrock 40 to 60"	0.02
Bosun	20	Poor source		Poor source	
		OM < .5%	0.00	Slopes > 25%	0.00
		AWC 3 - 6" to 60" depth	0.25	Depth to bedrock 40 to 60"	0.08
		pH between 4 and 6.5 above 40"	0.76		
420:					
Masthead	45	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		OM .5 to 1%	0.32	AASHTO GIN > 8 (low soil strength)	0.00
		AWC 3 - 6" to 60" depth	0.77	LEP 3 to 9	0.25
		K factor .10 -.35	0.90		
Luff	40	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.00	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.17

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
421:					
Masthead	45	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		OM .5 to 1%	0.32	AASHTO GIN > 8 (low soil strength)	0.00
		AWC 3 - 6" to 60" depth	0.77	LEP 3 to 9	0.25
		K factor .10 -.35	0.90	Slopes 15 to 25%	0.50
Luff	40	Poor source		Poor source	
		Clay > 40%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		pH between 4 and 6.5 above 40"	0.60	LEP 3 to 9	0.17
				Depth to bedrock 40 to 60"	0.32
422:					
Dewpoint	40	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		pH between 4 and 6.5 above 40"	0.60	Slopes > 25%	0.00
		AWC 3 - 6" to 60" depth	0.95	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.71
Masthead	25	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.27	AASHTO GIN > 8 (low soil strength)	0.00
		OM .5 to 1%	0.32	Slopes > 25%	0.00
		K factor .10 -.35	0.90	LEP 3 to 9	0.25
Coastwise	15	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.01	AASHTO GIN > 8 (low soil strength)	0.00
		OM .5 to 1%	0.32	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.80	LEP 3 to 9	0.83
		K factor .10 -.35	0.90		
423:					
Masthead	40	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.22	LEP > 9	0.00
		OM .5 to 1%	0.32	AASHTO GIN > 8 (low soil strength)	0.00
				Slopes > 25%	0.00

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
423:					
Coastwise	25	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC < 3" to 60" depth	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		OM .5 to 1%	0.32	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.60	LEP 3 to 9	0.83
Dewpoint	20	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		OM .5 to 1%	0.32	AASHTO GIN > 8 (low soil strength)	0.00
		pH between 4 and 6.5 above 40"	0.80	Slopes > 25%	0.00
				LEP 3 to 9	0.85
424:					
Masthead	45	Poor source		Poor source	
		Clay > 40%	0.00	Slopes > 25%	0.00
		OM .5 to 1%	0.50	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.26
Dewpoint	30	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		OM .5 to 1%	0.32	Slopes > 25%	0.00
		pH between 4 and 6.5 above 40"	0.80	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.47
Rock outcrop	15	Not rated		Not rated	
425:					
Coastwise, cobbly	60	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC < 3" to 60" depth	0.00	Slopes > 25%	0.00
		OM .5 to 1%	0.50	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.83
Masthead, cobbly	25	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.31	Slopes > 25%	0.00
		OM .5 to 1%	0.32	LEP 3 to 9	0.07
427:					
Masthead	40	Poor source		Poor source	
		Clay > 40%	0.00	Depth to bedrock < 40"	0.00
		OM .5 to 1%	0.50	Slopes > 25%	0.00
		AWC 3 - 6" to 60" depth	0.58	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.33

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
427:					
Coastwise, cobbly	25	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		Clay 27 to 40%	0.18	Slopes > 25%	0.00
		OM .5 to 1%	0.32	AASHTO GIN > 8 (low soil strength)	0.00
				LEP 3 to 9	0.25
Typic Haploxeralfs	20	Poor source		Poor source	
		AWC < 3" to 60" depth	0.00	Depth to bedrock < 40"	0.00
		OM .5 to 1%	0.50	Slopes > 25%	0.00
				LEP 3 to 9	0.78
450:					
Urban land	70	Not rated		Not rated	
Xerorthents, landscaped	30	Poor source		Good source	
		OM < .5%	0.00		
451:					
Nauti, landscaped	55	Poor source		Poor source	
		OM < .5%	0.00	Depth to bedrock < 40"	0.00
		AWC 3 - 6" to 60" depth	0.34	AASHTO GIN > 8 (low soil strength)	0.00
		K factor < .10	0.99	Slopes 15 to 25%	0.50
Urban land	30	Not rated		Not rated	
453:					
Typic Argixerolls	70	Poor source		Poor source	
		Clay > 40%	0.00	AASHTO GIN > 8 (low soil strength)	0.00
		pH between 4 and 6.5 above 40"	0.88		
		K factor < .10	0.99		
Urban land, landscaped	15	Not rated		Not rated	
454:					
Typic Argixerolls, landscaped	50	Fair source		Good source	
		pH between 4 and 6.5 above 40"	0.80		
Calcic Haploxerolls, landscaped	25	Poor source		Good source	
		OM < .5%	0.00		
Urban land, landscaped	15	Not rated		Not rated	

Table 6b.--Construction Materials--Continued

Map symbol and component name	Pct. of map unit	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value
456:					
Typic Xerorthents, fill-----------	60	Poor source		Good source	
		OM < .5%	0.00		
		K factor < .10	0.99		
Typic Xerorthents, steep fill-----	25	Poor source		Poor source	
		OM < .5%	0.00	Slopes > 25%	0.00
DAM:					
Dam------------------------------	100	Not rated		Not rated	
GP:					
Gravel pits-----------------------	100	Not rated		Not rated	
W:					
Water----------------------------	100	Not rated		Not rated	

The interpretation for reclamation material evaluates the following soil properties at variable depths in the soil: the amount of sand, clay, and fragments; the content of organic matter (OM); the wind erodibility group (WEG); the available water capacity (AWC); pH; salinity (EC); the amount of sodium (SAR); carbonates; and susceptibility of the soil to water erosion (K factor).

The interpretation for roadfill evaluates the following soil properties at variable depths in the soil: shrink-swell potential expressed as linear extensibility percent (LEP), depth to bedrock or a cemented pan, wetness, slope, soil strength expressed as AASHTO group index number (AASHTO GIN), and content of fragments.

Table 7a.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
156:					
Tongva	40	Limitations		Limitations	
		High piping potential	0.89	Slopes > 7%	1.00
		Thin layer	0.87	Depth to bedrock from 20-60"	0.87
				Permeability .6-2"/hr (some seepage)	0.50
Freeboard	30	Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock from 20-60"	0.08
		High piping potential	0.11		
Starbright	15	Limitations		Limitations	
		Shrink-swell (LEP 3-6)	0.78	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock from 20-60"	0.32
		Thin layer	0.32		
157:					
Tongva	40	Limitations		Limitations	
		Thin layer	0.95	Slopes > 7%	1.00
		High piping potential	0.39	Depth to bedrock from 20-60"	0.95
Pachic Argixerolls	30	Limitations		Limitations	
		Shrink-swell (LEP 3-6)	0.78	Slopes > 7%	1.00
		Thin layer	0.68	Depth to bedrock from 20-60"	0.68
		MH or CH Unified and PI <40%	0.50		
Freeboard	15	Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock from 20-60"	0.32
		Thin layer	0.32		
160:					
Beaches	75	Not rated		Not rated	
Abaft	15	Limitations		Limitations	
		Possible seepage problem	0.50	Permeability > 2"/hr (seepage)	1.00

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
181:					
Haploxerepts	40	Limitations		Limitations	
		Thin layer	0.87	Slopes > 7%	1.00
		Fragments (>3") 15-35%	0.01	Permeability > 2"/hr (seepage)	1.00
				Depth to bedrock from 20-60"	0.87
Purser	30	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock < 20"	1.00
		MH or CH Unified and PI <40%	0.50		
Rock outcrop	15	Not rated		Not rated	
182:					
Luff	35	Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Slopes > 7%	1.00
		Thin layer	0.95	Depth to bedrock from 20-60"	0.95
		MH or CH Unified and PI <40%	0.50		
Haploxerepts	30	Limitations		Limitations	
		Thin layer	0.40	Slopes > 7%	1.00
				Depth to bedrock from 20-60"	0.40
Haploxeralfs	20	Limitations		Limitations	
		Shrink-swell (LEP 3-6)	0.78	Slopes > 7%	1.00
183:					
Purser	55	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock < 20"	1.00
		MH or CH Unified and PI <40%	0.50		
Luff	25	Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Slopes > 7%	1.00
		Thin layer	0.94	Depth to bedrock from 20-60"	0.94
		MH or CH Unified and PI <40%	0.50	Permeability .6-2"/hr (some seepage)	0.50
184:					
Dewpoint	45	Limitations		Limitations	
		Thin layer	0.89	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock from 20-60"	0.89
		MH or CH Unified and PI <40%	0.50		

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
184:					
Luff	30	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		Shrink-swell (LEP >6)	1.00	Depth to bedrock < 20"	1.00
		MH or CH Unified and PI <40%	0.50		
185:					
Purser, coastal cliffs	65	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock < 20"	1.00
		MH or CH Unified and PI <40%	0.50		
Rock outcrop, coastal cliffs	20	Not rated		Not rated	
190:					
Typic Xerofluvents	70	Limitations		Limitations	
		Ponding (any duration)	1.00	Permeability > 2"/hr (seepage)	1.00
		Seepage problem	1.00	Slopes 2 to 7%	0.08
Riverwash	15	Not rated		Not rated	
191:					
Typic Haploxerepts	40	Limitations		Limitations	
		Possible seepage problem	0.50	Permeability > 2"/hr (seepage)	1.00
				Slopes 2 to 7%	0.31
Typic Xerofluvents	30	Limitations		Limitations	
		Ponding (any duration)	1.00	Permeability > 2"/hr (seepage)	1.00
		Seepage problem	1.00	Slopes 2 to 7%	0.31
Argixerolls	20	No limitations		Limitations	
				Permeability > 2"/hr (seepage)	1.00
				Slopes 2 to 7%	0.31
293:					
Rock outcrop	65	Not rated		Not rated	
Nauti	15	Limitations		Limitations	
		Thin layer	0.82	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.50	Depth to bedrock from 20-60"	0.82
		MH or CH Unified and PI <40%	0.50		

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees: Limitations	Value	Pond reservoir areas: Limitations	Value
293:					
Haploxerepts	15	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
				Depth to bedrock < 20"	1.00
				Permeability .6-2"/hr (some seepage)	0.68
400:					
Oboship	40	No limitations		Limitations	
				Slopes > 7%	1.00
				Permeability .6-2"/hr (some seepage)	0.50
Nauti	25	Limitations		Limitations	
		Thin layer	0.82	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.50	Depth to bedrock from 20-60"	0.82
Bosun	20	Limitations		Limitations	
		Thin layer	0.18	Slopes > 7%	1.00
				Permeability > 2"/hr (seepage)	1.00
				Depth to bedrock from 20-60"	0.18
407:					
Nauti	55	Limitations		Limitations	
		Thin layer	0.74	Slopes > 7%	1.00
				Depth to bedrock from 20-60"	0.74
Flyer	15	Limitations		Limitations	
		Thin layer	0.68	Slopes > 7%	1.00
				Permeability > 2"/hr (seepage)	1.00
				Depth to bedrock from 20-60"	0.68
Marpol	15	Limitations		Limitations	
		Shrink-swell (LEP 3-6)	0.78	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock from 20-60"	0.40
		Thin layer	0.40		
410:					
Express	35	Limitations		Limitations	
		Thin layer	0.75	Slopes > 7%	1.00
				Permeability > 2"/hr (seepage)	1.00
				Depth to bedrock from 20-60"	0.75

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
410:					
Flyer	30	Limitations		Limitations	
		Thin layer	0.98	Slopes > 7%	1.00
				Depth to bedrock from 20-60"	0.98
				Permeability .6-2"/hr (some seepage)	0.50
Loadline	20	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
				Permeability > 2"/hr (seepage)	1.00
				Depth to bedrock < 20"	1.00
411:					
Flyer	45	Limitations		Limitations	
		Very high piping potential	1.00	Slopes > 7%	1.00
		Thin layer	0.98	Depth to bedrock from 20-60"	0.98
				Permeability .6-2"/hr (some seepage)	0.50
Loadline	25	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
				Permeability > 2"/hr (seepage)	1.00
				Depth to bedrock < 20"	1.00
Nauti	15	Limitations		Limitations	
		Thin layer	0.68	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.06	Depth to bedrock from 20-60"	0.68
		Low piping potential	0.02	Permeability .6-2"/hr (some seepage)	0.05
412:					
Flyer, gullied	30	Limitations		Limitations	
		Thin layer	0.98	Slopes > 7%	1.00
				Depth to bedrock from 20-60"	0.98
				Permeability .6-2"/hr (some seepage)	0.50
Express, gullied	25	Limitations		Limitations	
		Thin layer	0.40	Slopes > 7%	1.00
				Permeability > 2"/hr (seepage)	1.00
				Depth to bedrock from 20-60"	0.40
Bosun	20	Limitations		Limitations	
		Thin layer	0.32	Slopes > 7%	1.00
				Permeability .6-2"/hr (some seepage)	0.50
				Depth to bedrock from 20-60"	0.32

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
420:					
Masthead	45	Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Slopes > 7%	1.00
		Thin layer	0.92	Depth to bedrock from 20-60"	0.92
		MH or CH Unified and PI <40%	0.50		
Luff	40	Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Slopes > 7%	1.00
		Thin layer	0.99	Depth to bedrock < 20"	0.99
		MH or CH Unified and PI <40%	0.50		
421:					
Masthead	45	Limitations		Limitations	
		Thin layer	0.92	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock from 20-60"	0.92
		MH or CH Unified and PI <40%	0.50		
Luff	40	Limitations		Limitations	
		Shrink-swell (LEP >6)	1.00	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock from 20-60"	0.18
		Thin layer	0.18		
422:					
Dewpoint	40	Limitations		Limitations	
		Shrink-swell (LEP 3-6)	0.78	Slopes > 7%	1.00
		Thin layer	0.75	Depth to bedrock from 20-60"	0.75
		MH or CH Unified and PI <40%	0.50		
Masthead	25	Limitations		Limitations	
		Thin layer	0.98	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock from 20-60"	0.98
		MH or CH Unified and PI <40%	0.50		
Coastwise	15	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock < 20"	1.00
		Shrink-swell (LEP 3-6)	0.22		
423:					
Masthead	40	Limitations		Limitations	
		Thin layer	0.87	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock from 20-60"	0.87
		MH or CH Unified and PI <40%	0.50		

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
423:					
Coastwise	25	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock < 20"	1.00
		Shrink-swell (LEP 3-6)	0.22		
Dewpoint	20	Limitations		Limitations	
		Thin layer	0.87	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock from 20-60"	0.87
		MH or CH Unified and PI <40%	0.50	Permeability .6-2"/hr (some seepage)	0.50
424:					
Masthead	45	Limitations		Limitations	
		Shrink-swell (LEP 3-6)	0.78	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50		
Dewpoint	30	Limitations		Limitations	
		Thin layer	0.68	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock from 20-60"	0.68
				Permeability .6-2"/hr (some seepage)	0.50
Rock outcrop	15	Not rated		Not rated	
425:					
Coastwise, cobbly	60	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock < 20"	1.00
		Shrink-swell (LEP 3-6)	0.22		
Masthead, cobbly	25	Limitations		Limitations	
		Thin layer	0.86	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock from 20-60"	0.86
		Shrink-swell (LEP 3-6)	0.22		
427:					
Masthead	40	Limitations		Limitations	
		Thin layer	0.82	Slopes > 7%	1.00
		Shrink-swell (LEP 3-6)	0.78	Depth to bedrock from 20-60"	0.82
		MH or CH Unified and PI <40%	0.50		
Coastwise, cobbly	25	Limitations		Limitations	
		Thin layer	1.00	Slopes > 7%	1.00
		MH or CH Unified and PI <40%	0.50	Depth to bedrock < 20"	1.00

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
427:					
Typic Haploxeralfs----------------	20	Limitations		Limitations	
		Thin layer	0.99	Slopes > 7%	1.00
				Depth to bedrock from 20-60"	0.99
				Permeability .6-2"/hr (some seepage)	0.50
450:					
Urban land------------------------	70	Not rated		Not rated	
Xerorthents, landscaped-----------	30	Limitations		Limitations	
		Ponding (any duration)	1.00	Slopes 2 to 7%	0.31
		High piping potential	0.28		
451:					
Nauti, landscaped-----------------	55	Limitations		Limitations	
		Thin layer	0.82	Slopes > 7%	1.00
				Depth to bedrock from 20-60"	0.82
Urban land------------------------	30	Not rated		Not rated	
453:					
Typic Argixerolls-----------------	70	No limitations		Limitations	
				Slopes 2 to 7%	0.31
Urban land, landscaped------------	15	Not rated		Not rated	
454:					
Typic Argixerolls, landscaped-----	50	Limitations		Limitations	
		Ponding (any duration)	1.00	Permeability .6-2"/hr (some seepage)	0.50
				Slopes 2 to 7%	0.08
Calcic Haploxerolls, landscaped---	25	Limitations		Limitations	
		Ponding (any duration)	1.00	Permeability > 2"/hr (seepage)	1.00
		Slight seepage problem	0.10		
Urban land, landscaped------------	15	Not rated		Not rated	
456:					
Typic Xerorthents, fill-----------	60	No limitations		Limitations	
				Permeability .6-2"/hr (some seepage)	0.50
Typic Xerorthents, steep fill-----	25	No limitations		Limitations	
				Slopes > 7%	1.00
				Permeability .6-2"/hr (some seepage)	0.50

Table 7a.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Embankments, dikes, and levees		Pond reservoir areas	
		Limitations	Value	Limitations	Value
DAM:					
Dam	100	Not rated		Not rated	
GP:					
Gravel pits	100	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	

The interpretation for embankments, dikes, and levees evaluates the following soil properties at variable depths in the soil: ponding; wetness; depth to a restrictive layer; fragments more than 3 inches in size; salinity (EC); Unified classes for a high content of organic matter (PT, OL, and OH); Unified classes that are hard to pack (MH and CH); permeability that is too rapid, allowing seepage; piping as determined by Atterberg limits of liquid limit (LL) and plasticity index (PI); sodium content (SAR); and gypsum content.

The interpretation for pond reservoir areas evaluates the following soil properties at variable 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 rapid, allowing seepage.

Table 7b.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. The rating is based on the limitation with the highest value. Only the three highest value limitations are listed. There may be more limitations. Fine-earth fractions and coarse fragments are reported on a weight basis. An explanation of the rating criteria and of the abbreviations used in describing the limitations is given at the end of the table)

Map symbol and component name	Pct. of map unit	Sprinkler irrigation		Drip or trickle irrigation	
		Limitations	Value	Limitations	Value
156:					
Tongva	40	Limitations		No limitations	
		Depth to bedrock (hard) < 40"	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
Freeboard	30	Limitations		No limitations	
		Slopes > 15%	1.00		
		AWC 4-6"	0.14		
Starbright	15	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		AWC 4-6"	0.82		
157:					
Tongva	40	Limitations		No limitations	
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
		AWC < 4" to 40"	1.00		
Pachic Argixerolls	30	Limitations		No limitations	
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.99		
		AWC 4-6"	0.70		
Freeboard	15	Limitations		No limitations	
		Slopes > 15%	1.00		
		AWC 4-6"	0.59		
		Bedrock (soft) < 40" depth	0.52		
160:					
Beaches	75	Not rated		Not rated	
Abaft	15	Limitations		No limitations	
		Sandy surface textures	1.00		
		WEG = 1 or 2	1.00		
		AWC < 4" to 40"	1.00		

Table 7b.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Sprinkler irrigation: Limitations	Sprinkler irrigation: Value	Drip or trickle irrigation: Limitations	Drip or trickle irrigation: Value
181:					
Haploxerepts	40	Limitations		No limitations	
		Sandy surface textures	1.00		
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
Purser	30	Limitations		Limitations	
		Depth to bedrock (hard) < 40"	1.00	Bedrock depth < 20"	1.00
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
Rock outcrop	15	Not rated		Not rated	
182:					
Luff	35	Limitations		No limitations	
		Depth to bedrock (hard) < 40"	1.00		
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
Haploxerepts	30	Limitations		No limitations	
		WEG = 1 or 2	1.00		
		Slopes > 15%	1.00		
		AWC 4-6"	0.90		
Haploxeralfs	20	Limitations		Limitations	
		WEG = 1 or 2	1.00	Permeability <=.2"/hr AND not smectitic mineralogy	1.00
		Slopes > 15%	1.00		
		Permeability <=.2"/hr AND not smectitic mineralogy	1.00		
183:					
Purser	55	Limitations		Limitations	
		Depth to bedrock (hard) < 40"	1.00	Bedrock depth < 20"	1.00
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
Luff	25	Limitations		No limitations	
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.99		
		AWC 4-6"	0.73		
184:					
Dewpoint	45	Limitations		No limitations	
		Depth to bedrock (hard) < 40"	1.00		
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
Luff	30	Limitations		No limitations	
		Depth to bedrock (hard) < 40"	1.00		
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		

Table 7b.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Sprinkler irrigation: Limitations	Sprinkler irrigation: Value	Drip or trickle irrigation: Limitations	Drip or trickle irrigation: Value
185:					
Purser, coastal cliffs	65	Limitations		Limitations	
		Depth to bedrock (hard) < 40"	1.00	Bedrock depth < 20"	1.00
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
Rock outcrop, coastal cliffs	20	Not rated		Not rated	
190:					
Typic Xerofluvents	70	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		AWC < 4" to 40"	1.00	Flooding >= frequent in growing season	1.00
		Flooding >= frequent in growing season	1.00		
Riverwash	15	Not rated		Not rated	
191:					
Typic Haploxerepts	40	Limitations		No limitations	
		WEG = 1 or 2	1.00		
		AWC < 4" to 40"	1.00		
Typic Xerofluvents	30	Limitations		Limitations	
		Ponding (any duration)	1.00	Ponding (any duration)	1.00
		WEG = 1 or 2	1.00		
		AWC < 4" to 40"	1.00		
Argixerolls	20	Limitations		No limitations	
		Sandy surface textures	1.00		
		WEG = 1 or 2	1.00		
		AWC < 4" to 40"	1.00		
293:					
Rock outcrop	65	Not rated		Not rated	
Nauti	15	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
Haploxerepts	15	Limitations		Limitations	
		AWC < 4" to 40"	1.00	Bedrock depth < 20"	1.00
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.96		
400:					
Oboship	40	Limitations		No limitations	
		Slopes > 15%	1.00		
		AWC 4-6"	0.67		

Table 7b.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Sprinkler irrigation: Limitations	Value	Drip or trickle irrigation: Limitations	Value
400:					
Nauti	25	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
Bosun	20	Limitations		No limitations	
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.15		
407:					
Nauti	55	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
Flyer	15	Limitations		No limitations	
		Sandy surface textures	1.00		
		WEG = 1 or 2	1.00		
		AWC < 4" to 40"	1.00		
Marpol	15	Limitations		Limitations	
		Slopes > 15%	1.00	Permeability <=.2"/hr AND not smectitic mineralogy	1.00
		Surface K factor >.32 and slopes > 2%	1.00		
		Permeability <=.2"/hr AND not smectitic mineralogy	1.00		
410:					
Express	35	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		AWC < 4" to 40"	1.00		
Flyer	30	Limitations		No limitations	
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
Loadline	20	Limitations		Limitations	
		Sandy surface textures	1.00	Bedrock depth < 20"	1.00
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		

Table 7b.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Sprinkler irrigation: Limitations	Value	Drip or trickle irrigation: Limitations	Value
411:					
Flyer	45	Limitations		No limitations	
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
Loadline	25	Limitations		Limitations	
		AWC < 4" to 40"	1.00	Bedrock depth < 20"	1.00
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
Nauti	15	Limitations		No limitations	
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
		Bedrock (soft) < 40" depth	0.99		
412:					
Flyer, gullied	30	Limitations		No limitations	
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.97		
Express, gullied	25	Limitations		No limitations	
		Slopes > 15%	1.00		
		AWC < 4" to 40"	1.00		
		Bedrock (soft) < 40" depth	0.70		
Bosun	20	Limitations		No limitations	
		Slopes > 15%	1.00		
		AWC < 4" to 40"	1.00		
		Bedrock (soft) < 40" depth	0.52		
420:					
Masthead	45	Limitations		No limitations	
		Surface K factor >.32 and slopes > 2%	1.00		
		Bedrock (soft) < 40" depth	0.99		
		AWC 4-6"	0.51		
Luff	40	Limitations		No limitations	
		AWC < 4" to 40"	1.00		
		Bedrock (soft) < 40" depth	0.97		
		Slopes 6 to 15%	0.40		

Table 7b.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Sprinkler irrigation: Limitations	Value	Drip or trickle irrigation: Limitations	Value
421:					
Masthead------------	45	Limitations		No limitations	
		Surface K factor >.32 and slopes > 2%	1.00		
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.99		
Luff----------------	40	Limitations		No limitations	
		Slopes > 15%	1.00		
		AWC < 4" to 40"	1.00		
		Bedrock (soft) < 40" depth	0.15		
422:					
Dewpoint------------	40	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		AWC 4-6"	0.23		
Masthead------------	25	Limitations		No limitations	
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
		Bedrock (soft) < 40" depth	0.97		
Coastwise-----------	15	Limitations		Limitations	
		Depth to bedrock (hard) < 40"	1.00	Bedrock depth < 20"	1.00
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
423:					
Masthead------------	40	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		AWC < 4" to 40"	1.00		
Coastwise-----------	25	Limitations		Limitations	
		AWC < 4" to 40"	1.00	Bedrock depth < 20"	1.00
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.96		
Dewpoint------------	20	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		

Table 7b.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Sprinkler irrigation		Drip or trickle irrigation	
		Limitations	Value	Limitations	Value
424:					
Masthead-----------	45	Limitations		No limitations	
		Slopes > 15%	1.00		
		AWC 4-6"	0.02		
Dewpoint-----------	30	Limitations		No limitations	
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
		AWC < 4" to 40"	1.00		
Rock outcrop--------	15	Not rated		Not rated	
425:					
Coastwise, cobbly---	60	Limitations		Limitations	
		AWC < 4" to 40"	1.00	Bedrock depth < 20"	1.00
		Slopes > 15%	1.00		
		Bedrock (soft) < 40" depth	0.96		
Masthead, cobbly----	25	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		AWC 4-6"	0.91		
427:					
Masthead-----------	40	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Slopes > 15%	1.00		
		AWC 4-6"	0.69		
Coastwise, cobbly---	25	Limitations		Limitations	
		Depth to bedrock (hard) < 40"	1.00	Bedrock depth < 20"	1.00
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
Typic Haploxeralfs--	20	Limitations		No limitations	
		AWC < 4" to 40"	1.00		
		Slopes > 15%	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
450:					
Urban land----------	70	Not rated		Not rated	
Xerorthents, landscaped---------	30	No limitations		No limitations	
451:					
Nauti, landscaped---	55	Limitations		No limitations	
		Bedrock (soft) < 40" depth	1.00		
		Surface K factor >.32 and slopes > 2%	1.00		
		Slopes > 15%	1.00		
Urban land----------	30	Not rated		Not rated	

Table 7b.--Water Management--Continued

Map symbol and component name	Pct. of map unit	Sprinkler irrigation		Drip or trickle irrigation	
		Limitations	Value	Limitations	Value
453:					
Typic Argixerolls---	70	Limitations		No limitations	
		Surface K factor >.32 and slopes > 2%	1.00		
Urban land, landscaped---------	15	Not rated		Not rated	
454:					
Typic Argixerolls, landscaped---------	50	Limitations		No limitations	
		AWC 4-6"	0.64		
Calcic Haploxerolls, landscaped---------	25	Limitations		No limitations	
		AWC 4-6"	0.12		
Urban land, landscaped---------	15	Not rated		Not rated	
456:					
Typic Xerorthents, fill---------------	60	Limitations		No limitations	
		AWC 4-6"	0.76		
Typic Xerorthents, steep fill---------	25	Limitations		No limitations	
		Slopes > 15%	1.00		
DAM:					
Dam-----------------	100	Not rated		Not rated	
GP:					
Gravel pits---------	100	Not rated		Not rated	
W:					
Water---------------	100	Not rated		Not rated	

The interpretation for sprinkler irrigation evaluates the following soil properties at variable depths in the soil: texture of the surface layer; clay content more than 60 percent; flooding during the growing season; ponding; depth to wetness; available water capacity (AWC); slope; depth to hard or soft bedrock; depth to a cemented pan; fragments larger than 75 millimeters; sodium content (SAR); pH; clayey or sandy textures; permeability less than .5 cm/hr, resulting in saturated soil conditions; soil erodibility expressed as a K factor; electrical conductivity (EC); sodium content expressed as sodium adsorption ratio (SAR); and sulfur content based on taxonomic placement.

The interpretation for drip or trickle irrigation evaluates the following soil properties at variable depths in the soil: flooding, ponding, depth to wetness, depth to hard or soft bedrock, depth to a cemented pan, electrical conductivity (EC), sodium content expressed as sodium adsorption ratio (SAR), sulfur content based on taxonomic placement, and permeability less than .5 cm/hr.

Table 8.--Engineering Index Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and component 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:												
Tongva	0-1	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-4	Loam	CL-ML	A-4	0	0	77-100	76-100	67-100	47-77	26-43	7-18
	4-16	Loam	CL	A-4	0	0	77-100	76-100	66-100	46-76	26-43	7-18
	16-30	Gravelly clay loam	CL	A-6	0	0	70-100	69-100	62-100	49-84	36-50	18-28
	30-31	Bedrock	---	---	---	---	---	---	---	---	---	---
Freeboard	0-1	Clay loam	CH	A-7-6	0	0	74-100	73-100	65-96	52-79	38-55	19-24
	1-5	Clay	CL	A-6	0	0	75-91	74-90	64-87	49-69	44-61	25-32
	5-11	Clay loam	CH	A-7-6	0	0-1	76-91	74-91	58-89	43-71	35-59	16-32
	11-24	Clay loam	CH	A-7-6	0	0-8	75-100	75-100	65-97	52-80	35-49	17-25
	24-35	Gravelly sandy clay loam	CH	A-7-6	0	0-16	60-100	59-100	53-98	44-82	29-40	12-19
	35-51	Very gravelly sandy loam	CH	A-7-6	0	0-23	18-84	15-84	14-84	11-71	24-35	7-14
	51-59	Bedrock	---	---	---	---	---	---	---	---	---	---
Starbright	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	2-8	Gravelly loam	CL	A-6	0	0-8	69-92	68-91	49-84	33-63	29-39	12-19
	8-12	Loam	CH	A-7-6	0	0	76-91	74-91	58-91	44-77	49-71	29-44
	12-16	Clay loam	CH	A-7-6	0	0	83-91	82-91	72-90	59-76	51-76	29-44
	16-28	Clay	CH	A-7-6	0	0	83-91	82-91	72-90	59-76	51-76	29-44
	28-33	Clay loam	CH	A-7-6	0	0-25	13-83	10-82	8-82	6-68	51-76	29-44
	33-43	Clay loam	CH	A-7-6	0	0-25	13-83	10-82	8-82	6-68	51-76	29-44
	43-53	Bedrock	---	---	---	---	---	---	---	---	---	---
157:												
Tongva	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-4	Loam	CL	A-4	0	0	77-100	76-100	64-99	45-74	26-43	7-18
	4-11	Loam	CL	A-6	0	0	77-100	76-100	63-100	48-89	26-50	9-28
	11-21	Clay loam	CL	A-7-6	0	1-16	49-98	46-98	42-98	33-82	35-49	18-28
	21-26	Gravelly sandy clay loam	GC	A-7-6	0	1-16	49-98	46-98	39-98	29-78	27-44	12-25
	26-36	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
157:												
Pachic Argixerolls	0-2	Loam	CL	A-6	0	0	77-98	76-98	64-92	47-71	18-29	2-10
	2-7	Gravelly loam	CL	A-6	0	0-16	49-92	47-91	40-86	29-66	19-31	4-12
	7-16	Very gravelly clay loam	CH	A-7-6	0	0-17	29-76	24-74	21-72	17-59	35-50	17-26
	16-35	Extremely gravelly sandy loam	CH	A-7-6	0	0-25	9-68	6-67	4-51	2-25	26-41	7-13
	35-39	Bedrock	---	---	---	---	---	---	---	---	---	---
Freeboard	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-8	Loam	CL	A-6	0	0	53-100	51-100	42-92	31-69	29-39	12-19
	8-35	Clay loam	CH	A-7-6	0	0-1	50-100	48-100	43-99	34-81	44-59	25-33
	35-41	Clay loam	CH	A-7-6	0	0-25	71-100	70-100	62-98	52-83	37-53	17-25
	41-43	Gravelly sandy clay loam	CH	A-7-6	0	0-25	71-100	70-100	63-99	51-82	33-49	13-21
	43-47	Bedrock	---	---	---	---	---	---	---	---	---	---
160:												
Beaches.												
Abaft	0-5	Loamy sand	SM	A-2	0	0	100	100	77-84	27-34	0-22	NP-4
	5-13	Loamy sand	SM	A-2	0	0	100	100	77-84	27-34	0-22	NP-4
	13-59	Loamy sand	SM	A-2	0	0	100	100	77-84	27-34	0-21	NP-4
181:												
Haploxerepts	0-1	Loamy sand	SM	A-2	0	0	77-100	76-100	55-82	14-28	0-25	NP-6
	1-16	Very gravelly sandy loam	GM	A-1	0	0-25	31-76	26-74	18-58	10-36	0-23	NP-6
	16-30	Very gravelly sandy loam	GM	A-1	0	0-32	17-100	15-100	10-76	4-34	0-29	NP-6
	30-79	Bedrock	---	---	---	---	---	---	---	---	---	---
Purser	0-4	Gravelly loam	CL	A-6	0	0-8	69-100	68-100	58-100	42-79	29-46	12-25
	4-15	Gravelly clay loam	CH	A-7-6	0	0-1	75-100	73-100	66-100	53-85	44-63	25-37
	15-16	Bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
182:												
Luff	0-4	Gravelly silt loam	CL-ML	A-6	0	0	53-92	51-91	44-87	33-67	29-39	12-19
	4-10	Very gravelly silt loam	CL-ML	A-6	0	0	30-77	27-76	24-73	18-56	29-39	12-19
	10-22	Clay	CH	A-7-6	0	0-9	50-100	47-100	43-100	35-95	48-71	28-44
	22-26	Clay	CH	A-7-6	0	0-9	74-100	73-100	66-100	54-93	50-76	28-44
	26-39	Bedrock	---	---	---	---	---	---	---	---	---	---
Haploxerepts	0-3	Sandy loam	SM	A-2	0	0	34-100	32-100	23-86	11-48	17-32	2-12
	3-11	Gravelly sandy loam	GW-GM	A-1	0	0	44-80	42-79	29-68	13-38	0-30	NP-12
	11-19	Very gravelly loam	GW-GM	A-1	0	0-17	27-79	22-77	18-77	12-58	21-43	6-20
	19-31	Extremely gravelly loam	GW-GM	A-1	0	0-100	10-100	5-100	5-100	5-75	22-48	6-20
	31-41	Extremely gravelly loamy sand	GW-GM	A-1	0	0-100	5-100	5-100	0-84	0-35	0-34	NP-7
	41-79	Bedrock	---	---	---	---	---	---	---	---	---	---
Haploxeralfs	0-1	Clay loam	CL	A-7-6	0	0	84-100	83-100	71-96	54-75	37-51	17-25
	1-16	Clay	CH	A-7-6	0	0	83-100	83-100	74-100	61-84	50-63	29-36
	16-26	Clay	CH	A-7-6	0	0-17	74-91	73-91	59-83	43-63	54-66	32-40
	26-39	Clay	CH	A-7-6	0	0-17	74-91	73-91	63-88	42-62	49-61	29-37
	39-79	Gravelly clay loam	CL	A-7-6	0	0-16	74-92	73-91	63-88	49-71	39-50	21-29
183:												
Purser	0-2	Clay loam	CL	A-6	0	0	64-100	63-100	60-100	45-84	37-50	19-29
	2-15	Clay	CH	A-7-6	0	0	76-100	74-100	65-100	52-85	44-63	25-37
	15-24	Bedrock	---	---	---	---	---	---	---	---	---	---
Luff	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	2-4	Gravelly loam	CL	A-6	0	0	53-92	51-91	43-86	32-65	29-39	12-19
	4-13	Gravelly loam	CL	A-6	0	0	53-92	51-91	43-86	32-65	29-39	12-19
	13-22	Clay	CH	A-7-6	0	0-1	52-100	48-100	45-100	36-95	50-71	29-44
	22-35	Clay	CH	A-7-6	0	0-9	74-100	73-100	66-100	54-93	51-76	29-44
	35-79	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
184:												
Dewpoint	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-2	Silt loam	CL	A-6	0	0	77-100	76-100	66-93	49-71	29-38	12-18
	2-19	Clay	CH	A-7-6	0	0-1	76-100	74-100	69-100	55-95	48-70	28-44
	19-24	Clay	CH	A-7-6	0	0-25	75-100	74-100	67-100	54-93	50-74	28-44
	24-29	Silty clay loam	CH	A-7-6	0	0-25	71-100	70-100	62-100	51-100	42-76	21-44
	>29	Bedrock	---	---	---	---	---	---	---	---	---	---
Luff	0-1	Silt loam	CL	A-6	0	0	71-92	69-92	61-89	44-66	30-40	12-19
	1-6	Clay	CH	A-7	0	0	84-100	84-100	64-97	47-77	50-76	28-43
	6-20	Very gravelly clay	CH	A-7	0-8	0-16	54-100	52-100	41-98	32-81	54-74	29-44
	20-39	Bedrock	---	---	---	---	---	---	---	---	---	---
185:												
Purser, coastal cliffs	0-4	Loam	CL	A-6	0	0	64-100	63-100	53-94	39-71	29-39	12-19
	4-10	Clay loam	CH	A-7-6	0	0	76-100	74-100	65-100	52-85	44-63	25-37
	10-14	Clay	CH	A-7-6	0	0	76-100	74-100	65-100	52-85	44-63	25-37
	14-24	Bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop, coastal cliffs.												
190:												
Typic Xerofluvents	0-2	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	2-24	Sandy loam	SM	A-2	0	0	78-100	77-100	59-85	31-48	16-26	1-7
	24-39	Extremely gravelly sand	GW	A-1	0	0	24-31	17-25	13-20	1-2	0-17	NP-1
	39-72	Extremely cobbly sand	GW	A-1	6-15	25-41	13-65	9-63	7-49	1-5	0-20	NP-1
Riverwash.												

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
191:												
Typic Haploxerepts	0-2	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	2-8	Very gravelly sand	GM	A-1-a	0	0	100	100	75-79	7-11	0-21	NP-3
	8-31	Very gravelly sand	GM	A-1-a	0	0	100	100	75-79	7-11	21-31	1-4
	31-65	Extremely gravelly loamy sand	GW	A-1	0	0	100	100	77-81	27-31	19-25	1-4
	65-75	Very gravelly loam	CL	A-3	0	0	100	100	87-91	63-67	29-34	12-15
	75-83	Very gravelly loam	GC	A-3	0	0	100	100	87-91	63-67	29-34	12-15
Typic Xerofluvents	0-1	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-9	Sand	SM	A-1	0	0-8	77-100	76-100	55-83	4-15	16-26	1-7
	9-26	Very gravelly sand	GW	A-1-a	0	0-22	15-57	8-54	6-44	0-8	0-17	NP-1
	26-79	Very gravelly sand	GW	A-1-a	0-22	0-51	17-100	13-100	10-84	1-17	0-20	NP-1
Argixerolls	0-4	Very gravelly sand	SP-SM	A-1-a	0	0-3	87-100	47-100	38-82	11-24	15-19	1-3
	4-16	Loamy sand, very gravelly sand	SP-SM	A-1	0	0-3	87-100	48-100	37-78	4-11	15-19	1-3
	16-38	Very gravelly sandy clay loam	SC	A-2	0	0-16	69-100	53-100	46-89	27-53	31-35	14-16
	38-59	Loam	GC	A-1-b	0	0-16	83-100	66-100	59-91	44-68	32-36	15-17
293:												
Rock outcrop.												
Nauti	0-2	Loam	CL-ML	A-4	0	0	100	100	78-97	54-73	23-43	4-18
	2-7	Gravelly clay loam	CL, GC	A-6, A-7	0	0-25	45-91	43-91	37-90	28-72	37-46	19-29
	7-14	Gravelly clay	CH	A-7	0	0-26	43-91	41-90	38-90	31-77	52-63	29-37
	14-31	Clay loam	CH	A-7	0	0-25	72-100	71-100	58-95	45-76	40-57	19-29
	31-41	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
293:												
Haploxerepts	0-1	Gravelly sandy loam	SM		0	0-16	49-100	47-100	33-76	20-47	0-18	NP-3
	1-8	Sandy loam	SM		0	0	58-100	56-100	42-77	25-47	17-20	3-4
	8-16	Gravelly loam	GC-GM		0	0-17	48-100	46-100	39-87	26-59	18-22	4-6
	16-79	Bedrock	---	---	---	---	---	---	---	---	---	---
400:												
Oboship	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-9	Gravelly loam	SC-SM	A-4	0	0-3	53-91	51-91	40-81	27-58	23-35	4-12
	9-22	Gravelly loam	CL	A-4	0	0-3	53-91	51-91	46-91	34-74	29-51	12-24
	22-33	Gravelly loam	CL	A-4	0	0-17	48-76	46-75	39-75	29-60	31-49	11-24
	33-60	Extremely gravelly loam	GC	A-7	0	24-31	11-73	7-72	6-72	5-57	31-49	11-24
	60-70	Bedrock	---	---	---	---	---	---	---	---	---	---
Nauti	0-2	Loam	CL-ML	A-4	0	0	100	100	78-97	54-73	23-43	4-18
	2-7	Gravelly clay loam	CL	A-6	0	0-25	45-91	43-91	37-90	28-72	37-46	19-29
	7-14	Cobbly clay	CL	A-6	0	0-26	43-91	41-90	37-90	31-77	52-63	29-37
	14-31	Clay loam	CL	A-6	0	0-25	72-100	71-100	58-95	45-76	40-57	19-29
	31-41	Bedrock	---	---	---	---	---	---	---	---	---	---
Bosun	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	2-6	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	6-14	Gravelly sandy loam	SM	A-4	0	0-3	54-92	50-91	43-91	28-66	0-35	NP-12
	14-24	Gravelly loam	CL	A-4	0	0-3	52-91	50-91	41-90	30-68	31-53	12-24
	24-31	Extremely gravelly sandy clay loam	GC	A-1	0	5-12	16-77	8-75	7-75	5-59	33-51	12-24
	31-47	Extremely gravelly sandy clay loam	GC	A-1	0	5-38	15-77	7-75	6-75	4-59	31-49	11-24
	47-49	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
407:												
Nauti	0-2	Loam	CL-ML	A-4	0	0	84-100	83-100	70-89	46-61	25-33	6-10
	2-8	Loam	CL	A-4	0	0	70-100	68-100	56-89	35-58	26-37	9-13
	8-28	Silty clay loam	CL	A-7	0	0	76-91	75-91	73-91	59-80	39-50	21-29
	28-34	Gravelly silty clay loam	CL	A-7	0	0	63-76	62-75	53-72	43-60	43-54	23-31
	34-43	Bedrock	---	---	---	---	---	---	---	---	---	---
Flyer	0-4	Gravelly loamy sand	SC-SM	A-4	0	0-17	55-92	51-91	22-53	8-27	0-33	NP-10
	4-13	Gravelly sandy loam	SM	A-2	0	0-17	49-91	47-91	29-73	16-48	0-30	NP-13
	13-28	Very gravelly loam	CL	A-4	0	0-17	50-77	46-75	35-71	25-55	20-38	4-19
	28-35	Extremely gravelly sandy clay loam	GC	A-1	0	0-17	14-77	10-75	7-63	4-44	31-44	13-24
	35-39	Bedrock	---	---	---	---	---	---	---	---	---	---
Marpol	0-1	Gravelly loam	CL-ML	A-4	0	0	77-100	75-100	75-100	75-85	23-43	4-18
	1-10	Clay loam	CL	A-7	0	0	100	100	100	85-95	39-53	19-29
	10-28	Clay	CH	A-7	0	0	74-100	73-100	66-100	54-93	52-72	29-44
	28-41	Clay	CH	A-7	0	0	74-100	73-100	66-100	54-93	52-72	29-44
	41-45	Bedrock	---	---	---	---	---	---	---	---	---	---
410:												
Express	0-8	Sandy loam	SM	A-2-4	0	0	85-100	84-100	63-77	31-39	18-31	3-4
	8-20	Loam	CL-ML	A-4	0	0	84-100	84-100	72-88	50-62	21-29	4-6
	20-33	Loamy sand	SM	A-2-4	0	0	79-93	78-92	61-74	23-29	16-21	2-4
	33-43	Bedrock	---	---	---	---	---	---	---	---	---	---
Flyer	0-9	Sandy loam	SM	A-2-4	0	0	58-100	56-100	42-81	20-42	18-35	3-7
	9-16	Loam	CL-ML	A-4	0	0	57-100	56-100	48-89	33-64	20-26	6-9
	16-24	Loam	CL	A-4	0	0	57-100	56-100	48-90	34-66	25-31	10-13
	24-33	Bedrock	---	---	---	---	---	---	---	---	---	---
Loadline	0-4	Loamy sand	SM	A-2-4	0	0	71-100	70-100	55-92	20-43	17-40	1-12
	4-16	Sandy loam	SM	A-2-4	0	0	77-92	76-91	57-76	28-41	19-37	3-10
	16-19	Gravelly sandy loam	SC-SM	A-2-4	0	0	79-92	51-76	34-63	14-33	0-34	NP-12
	19-29	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
411:												
Flyer	0-9	Sandy loam	SM	A-2-4	0	0	100	100	75-81	36-42	18-35	3-7
	9-16	Loam	CL-ML	A-4	0	0	100	100	85-89	60-64	20-26	6-9
	16-24	Loam	CL-ML	A-4	0	0	100	100	86-90	62-66	25-31	10-13
	24-31	Bedrock	---	---	---	---	---	---	---	---	---	---
Loadline	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-2	Sandy loam	SM	A-4	0	0	100	100	77-79	40-42	15-19	1-3
	2-8	Fine sandy loam	CL-ML	A-4	0	0	100	100	86-88	52-54	18-22	4-6
	8-15	Sandy loam	SC-SM	A-4	0	0	89-95	88-95	67-74	34-39	19-23	5-7
	15-18	Bedrock	---	---	---	---	---	---	---	---	---	---
Nauti	0-4	Loam	CL	A-4	0	0	100	100	86-90	61-65	27-34	8-11
	4-10	Silty clay	CL	A-7-6	0	0	100	100	97-100	92-96	48-56	27-31
	10-31	Clay loam	CL	A-7-6	0	0	100	100	89-93	70-74	37-44	19-23
	31-35	Very gravelly sandy loam	SC-SM	A-4	0	0	100	100	75-79	38-42	18-25	4-7
	35-45	Bedrock	---	---	---	---	---	---	---	---	---	---
412:												
Flyer, gullied	0-4	Sandy loam	SM	A-2-4	0	0	100	100	73-75	32-34	16-30	1-3
	4-9	Loamy sand	SM	A-2-4	0	0	100	100	78-82	20-24	18-24	4-7
	9-24	Sandy loam	SM	A-2-4	0	0	100	100	69-74	24-29	22-28	7-11
	24-33	Bedrock	---	---	---	---	---	---	---	---	---	---
Express, gullied	0-14	Sandy loam	SM	A-2-4	0	0	70-92	69-91	51-72	25-37	18-33	3-6
	14-30	Gravelly sandy loam	SC-SM	A-2-4	0	0	48-92	45-91	31-75	14-41	0-33	NP-10
	30-41	Very gravelly loamy sand	GP-GC	A-1-a	0	0-24	11-91	7-91	5-75	2-25	18-25	4-7
	41-43	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
412:												
Bosun	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	2-3	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	3-12	Gravelly sandy loam	SC-SM	A-2-4	0	0-3	63-77	62-76	43-65	19-36	0-42	NP-12
	12-22	Gravelly loam	CL	A-4	0	0-3	57-70	55-68	47-63	34-46	27-36	11-16
	22-33	Very gravelly loam	CL	A-4	0	0-7	32-42	29-40	25-38	18-28	27-37	11-18
	33-43	Extremely gravelly sandy loam	GC	A-1	0	8-24	10-20	6-17	5-13	2-7	22-30	7-12
	43-45	Bedrock	---	---	---	---	---	---	---	---	---	---
420:												
Masthead	0-1	Silt loam	CL-ML	A-4	0	0	91-100	91-100	80-98	63-79	21-35	4-12
	1-6	Silt loam	CL-ML	A-4	0	0	91-100	91-100	80-98	63-79	21-35	4-12
	6-12	Silty clay loam	MH	A-7	0	0	91-100	91-100	83-100	76-96	39-53	19-29
	12-28	Silty clay	MH	A-7	0	0	91-100	91-100	84-100	76-100	50-70	29-44
	28-33	Bedrock	---	---	---	---	---	---	---	---	---	---
Luff	0-2	Silt loam	CL	A-6	0	0	54-100	52-100	48-100	36-77	29-39	12-19
	2-7	Silt loam	CH	A-7-6	0	0	56-100	53-100	47-98	38-81	29-43	12-20
	7-22	Clay	CH	A-7-6	0	0	75-100	74-100	60-100	50-87	50-76	28-44
	22-24	Bedrock	---	---	---	---	---	---	---	---	---	---
421:												
Masthead	0-1	Silt loam	CL-ML	A-4	0	0	91-100	91-100	80-98	63-79	21-35	4-12
	1-6	Silt loam	CL-ML	A-4	0	0	91-100	91-100	80-98	63-79	21-35	4-12
	6-12	Silty clay loam	MH	A-7	0	0	91-100	91-100	83-100	76-96	39-53	19-29
	12-28	Silty clay	MH	A-7	0	0	91-100	91-100	84-100	76-100	50-70	29-44
	28-33	Bedrock	---	---	---	---	---	---	---	---	---	---
Luff	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-3	Silt loam	CL-ML	A-4	0	0	77-92	76-91	68-86	55-69	25-39	6-9
	3-9	Clay loam	CL	A-7-6	0	0	77-92	76-91	67-86	52-69	45-58	23-27
	9-24	Clay	CH	A-7-6	0	0	76-91	75-91	69-89	56-74	53-64	30-35
	24-47	Clay	CH	A-7-6	0	0	76-91	75-91	69-89	56-74	53-62	30-35
	47-51	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
422:												
Dewpoint	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-6	Gravelly silt loam	CL-ML	A-4	0	0-5	52-100	50-100	37-89	28-71	17-35	1-12
	6-11	Very gravelly silt loam	CL-ML	A-4	0	0-5	48-100	45-100	34-84	25-65	21-35	4-12
	11-18	Very gravelly clay	MH	A-7	0	0-10	45-100	43-100	34-100	27-95	39-72	19-43
	18-33	Gravelly clay	MH	A-7	0	0-20	41-100	38-100	27-100	22-90	39-72	19-43
	33-43	Bedrock	---	---	---	---	---	---	---	---	---	---
Masthead	0-2	Loam	CL-ML	A-4	0	0	91-100	91-100	79-98	62-80	27-43	9-18
	2-24	Gravelly clay	MH	A-7	0	0	100	100	92-100	83-100	50-70	29-44
	24-33	Bedrock	---	---	---	---	---	---	---	---	---	---
Coastwise	0-1	Loam	CL-ML	A-4	0	0	78-100	76-100	66-100	46-79	23-43	4-18
	1-4	Silt loam	CL-ML	A-4	0	0	91-100	91-100	71-100	57-85	17-43	1-18
	4-10	Clay loam	MH	A-7	0	0	75-100	74-100	61-95	47-76	39-53	19-29
	10-19	Clay	MH	A-7	0	0	74-100	73-100	66-100	53-93	49-68	28-44
	>19	Bedrock	---	---	---	---	---	---	---	---	---	---
423:												
Masthead	0-4	Gravelly silt loam	CL-ML	A-6	0	0-20	52-76	50-75	37-73	32-65	20-45	2-19
	4-11	Clay	MH	A-7	0	0-55	100	100	82-100	71-91	49-68	28-44
	11-30	Gravelly clay	MH	A-7	0	0-65	49-74	47-73	42-73	34-68	52-72	29-44
	30-31	Bedrock	---	---	---	---	---	---	---	---	---	---
Coastwise	0-1	Very cobbly slightly decomposed plant material	PT	A-8	0	0-35	---	---	---	---	---	NP
	1-6	Gravelly sandy loam	SC-SM	A-2-4	0	0	52-76	50-75	32-57	13-28	0-30	NP-7
	6-15	Clay	MH	A-7	0	0	74-100	73-100	66-100	53-93	49-68	28-44
	15-18	Clay	MH	A-7	0	0	74-100	73-100	66-100	53-93	49-68	28-44
	18-20	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
423:												
Dewpoint	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-4	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	4-7	Loam	CL	A-6	0	0	76-100	75-100	65-90	46-66	27-37	10-13
	7-13	Gravelly silt loam	CL-ML	A-4	0	0	57-100	55-100	50-94	39-75	19-29	3-6
	13-26	Clay	MH	A-7	0	0	74-100	73-100	59-100	49-87	49-68	28-44
	26-30	Very gravelly clay	MH	A-7	0	0	49-77	44-75	35-75	29-67	36-57	18-36
	30-39	Bedrock	---	---	---	---	---	---	---	---	---	---
424:												
Masthead	0-10	Silt loam	ML	A-6	0	0	52-76	50-75	44-73	38-65	31-45	12-19
	10-26	Gravelly silty clay loam	MH	A-7	0	0	100	100	85-100	72-92	52-72	29-44
	26-53	Very gravelly silty clay	MH	A-7	0	0	49-74	47-73	42-73	34-68	49-68	28-44
	53-79	Clay	MH	A-7	0	0	49-74	47-73	43-73	36-70	52-72	29-44
Dewpoint	0-2	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	2-4	Moderately decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	4-9	Silt loam	CL-ML	A-4	0	0	76-100	75-100	66-98	52-79	21-35	4-12
	9-13	Silt loam	CL-ML	A-4	0	0-5	76-100	75-100	66-98	52-79	21-35	4-12
	13-26	Gravelly clay	MH	A-7	0	0-10	45-100	43-100	38-100	31-93	52-72	29-44
	26-35	Gravelly silty clay loam	MH	A-7	0	0-10	50-77	45-75	33-75	29-73	36-66	18-43
	35-45	Bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
425:												
Coastwise, cobbly	0-5	Cobbly silt loam	ML	A-6	0	0-35	34-91	31-91	25-91	21-83	20-45	2-19
	5-17	Clay	MH	A-7	0	0	74-100	73-100	66-100	56-97	52-72	29-44
	17-20	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
425:												
Masthead, cobbly	0-1	Gravelly silt loam	ML	A-6	0	0-35	48-76	45-75	36-75	31-68	20-45	2-19
	1-6	Silt loam	ML	A-6	0	0-35	52-91	50-91	38-89	32-79	20-45	2-19
	6-16	Clay	MH	A-7	0	0-35	74-100	73-100	60-100	52-91	49-68	28-44
	16-30	Very gravelly clay	MH	A-7	0	0-80	9-74	5-73	5-73	4-68	52-72	29-44
	30-35	Bedrock	---	---	---	---	---	---	---	---	---	---
427:												
Masthead	0-1	Gravelly silt loam	ML	A-6	0	0-35	48-76	45-75	39-75	34-72	20-45	2-19
	1-6	Gravelly silt loam	ML	A-6	0	0-35	52-83	50-83	41-83	35-77	20-45	2-19
	6-24	Clay	MH	A-7	0	0-35	74-100	73-100	66-100	56-97	49-68	28-44
	24-31	Extremely gravelly clay	GC	A-2	0	0-80	9-74	5-73	5-73	4-68	52-72	29-44
	31-33	Bedrock	---	---	---	---	---	---	---	---	---	---
Coastwise, cobbly	0-6	Very gravelly sandy loam	SC-SM	A-2-4	0	0-16	33-76	30-75	19-57	8-28	0-30	NP-7
	6-15	Gravelly clay loam	MH	A-7	0	0	51-91	49-91	40-86	31-69	39-53	19-29
	15-16	Bedrock	---	---	---	---	---	---	---	---	---	---
Typic Haploxeralfs	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-2	Sandy loam	SM	A-2	0	0	83-100	83-100	75-95	49-63	19-26	3-6
	2-7	Gravelly sandy loam	SM	A-2	0	0	64-77	62-76	57-72	39-50	19-26	3-7
	7-15	Gravelly loam	ML	A-4	0	0	57-69	55-68	44-57	23-31	28-35	10-14
	15-23	Very gravelly loam	ML	A-4	0	9-25	42-53	40-51	32-44	18-25	31-38	13-17
	23-39	Bedrock	---	---	---	---	---	---	---	---	---	---
450:												
Urban land.												
Xerorthents, landscaped	0-2	Sandy loam	SM	A-4	0	0	100	100	72-78	34-40	0-43	NP-5
	2-12	Loam	ML	A-4	0	0	100	100	88-92	66-70	31-38	15-19
	12-59	Clay loam	CL	A-7	0	0	100	100	89-93	70-74	36-42	19-23
	59-79	Loamy sand	SC-SM	A-2-4	0	0	100	100	79-83	24-28	18-24	4-7

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
451:												
Nauti, landscaped-------------	0-7	Loam	CL-ML	A-4	0	0	100	100	77-96	53-72	23-43	4-18
	7-16	Gravelly clay loam	CL	A-6	0	0-25	45-91	43-91	38-91	29-75	37-46	19-29
	16-24	Cobbly clay	CL	A-6	0	0-26	43-91	41-90	38-90	31-77	52-63	29-37
	24-30	Gravelly clay loam	CL	A-6	0	0-25	72-100	71-100	63-100	49-82	40-57	19-29
	30-39	Bedrock	---	---	---	---	---	---	---	---	---	---
Urban land.												
453:												
Typic Argixerolls-------------	0-2	Silt loam	CL-ML	A-4	0	1-3	84-92	83-91	75-86	60-69	22-32	6-9
	2-11	Silt loam	CL	A-6	0	1-3	84-92	83-91	76-88	64-74	28-39	12-15
	11-26	Clay	CL	A-6	0	1-3	91-98	91-98	82-97	67-81	47-60	28-35
	26-59	Clay	CL	A-6	0	2-3	82-91	81-90	74-90	66-81	55-67	36-43
Urban land, landscaped.												
454:												
Typic Argixerolls, landscaped--	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-5	Gravelly loam	SC	A-4	0	0	85-100	56-83	44-81	30-60	23-47	4-18
	5-16	Clay loam	CL	A-6	0	0-7	75-91	74-91	66-85	52-67	39-49	19-23
	16-37	Gravelly coarse sandy loam	SM	A-2-4	0	0	71-84	57-84	35-54	20-33	24-32	8-11
	37-63	Gravelly sandy clay loam	SC	A-7	0	0	71-84	69-84	58-74	31-41	28-35	12-16
Calcic Haploxerolls, landscaped	0-1	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	NP
	1-3	Loam	CL	A-6	0	0	100	82-100	68-97	48-73	24-43	7-18
	3-10	Loam	CL	A-6	0	0	97-100	79-100	66-93	48-71	30-42	12-20
	10-19	Loam	CL	A-6	0	0	97-100	80-100	66-93	49-71	30-42	12-20
	19-26	Gravelly sandy loam	SC-SM	A-2-4	0	0	85-100	62-91	43-78	20-44	0-29	NP-7
	26-47	Loam	CL	A-6	0	0	83-100	83-100	68-97	48-73	22-33	7-9
	47-61	Loamy sand	SM	A-2-4	0	0	90-100	70-95	54-82	19-35	0-22	NP-3
Urban land, landscaped.												

Table 8.--Engineering Index Properties--Continued

Map symbol and component 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	
456:												
Typic Xerorthents, fill--------	0-4	Gravelly silt loam	GM	A-4	0	0-3	64-77	62-76	52-70	38-53	0-23	NP-5
	4-61	Very gravelly silt loam	GC-GM	A-4	0	5-11	47-58	45-56	38-53	30-43	0-24	NP-7
	61-79	Very gravelly loam	GC-GM	A-4	0	8-23	47-63	45-61	37-58	30-49	0-24	NP-7
Typic Xerorthents, steep fill--	0-6	Gravelly silt loam	CL-ML	A-4	0	0-17	66-83	65-83	58-77	46-61	17-24	3-6
	6-79	Very gravelly silt loam	GC-GM	A-2-4	0	0-9	44-57	42-55	38-52	30-41	18-25	4-7
DAM.												
Dam												
GP.												
Gravel pits												
W.												
Water												

Table 9.--Physical Properties of the Soils

(See text for definitions of terms used in this table. Absence of an entry indicates that data were not estimated)

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
156:							
Tongva------------------------	0-1	0-2	0.50-1.00	42.00-141.00	0.02-0.10	0.0-0.0	50-100
	1-4	12-27	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	2.0-3.0
	4-16	12-27	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	2.0-3.0
	16-30	27-40	1.40-1.50	1.40-4.20	0.15-0.19	1.0-2.9	0.5-1.0
	30-31	---	---	---	0.00-0.00	0.0-0.0	0.0-0.0
Freeboard---------------------	0-1	28-36	1.25-1.45	4.20-14.10	0.10-0.14	0.0-0.0	1.0-5.0
	1-5	35-45	1.25-1.45	4.20-14.10	0.10-0.14	3.0-8.0	0.5-3.0
	5-11	24-44	1.25-1.45	0.42-1.40	0.11-0.13	3.0-12.0	0.5-1.5
	11-24	25-35	1.35-1.55	0.42-1.41	0.14-0.16	3.0-9.0	0.2-0.8
	24-35	18-26	1.35-1.55	0.42-1.41	0.14-0.16	3.0-9.0	0.0-0.5
	35-51	12-20	1.35-1.55	0.42-1.41	0.14-0.16	3.0-9.0	0.0-0.5
	51-59	---	---	---	0.01-0.02	0.0-0.0	0.0-0.0
Starbright--------------------	0-2	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	2-8	5-25	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	8-12	25-50	1.25-1.45	0.42-1.40	0.11-0.13	5.0-12.0	0.3-0.7
	12-16	38-50	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	16-28	38-50	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	28-33	30-50	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	33-43	30-50	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	43-53	---	---	---	---	---	0.0-0.0
157:							
Tongva------------------------	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.19	0.0-0.0	50-100
	1-4	12-27	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	2.0-3.0
	4-11	15-40	1.40-1.50	1.40-4.20	0.15-0.19	0.0-2.9	0.5-1.0
	11-21	27-40	1.40-1.50	1.40-4.20	0.11-0.15	0.0-2.9	0.0-0.5
	21-26	18-35	1.40-1.50	1.40-4.20	0.11-0.15	0.0-2.9	0.0-0.5
	26-36	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
Pachic Argixerolls------------	0-2	5-15	1.45-1.55	4.20-14.10	0.14-0.18	3.0-6.0	0.0-0.5
	2-7	7-17	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	7-16	25-35	1.25-1.45	0.42-1.40	0.11-0.13	3.0-12.0	0.3-0.7
	16-35	12-18	1.25-1.45	0.42-1.41	0.10-0.15	3.0-12.0	1.0-3.0
	35-39	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
Freeboard---------------------	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	1-8	18-27	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	8-35	35-45	1.25-1.45	0.42-1.40	0.11-0.13	3.0-12.0	0.3-0.7
	35-41	25-35	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	41-43	20-30	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	43-47	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
160:							
Beaches.							
Abaft-------------------------	0-5	1-8	1.55-1.65	42.00-141.00	0.06-0.08	0.0-2.9	0.5-1.0
	5-13	1-8	1.55-1.65	42.00-141.00	0.06-0.08	0.0-2.9	0.5-1.0
	13-59	1-8	1.55-1.65	42.00-141.00	0.06-0.08	0.0-2.9	0.0-0.5
181:							
Haploxerepts------------------	0-1	0-10	1.45-1.55	4.20-14.10	0.10-0.14	0.0-6.0	0.0-0.5
	1-16	1-10	1.25-1.45	14.00-42.00	0.08-0.13	0.0-2.9	0.3-0.7
	16-30	1-10	1.25-1.45	14.00-42.00	0.08-0.13	0.0-2.9	1.0-3.0
	30-79	---	---	1.41-4.23	0.00-0.02	0.0-0.0	0.0-0.0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
181:							
Purser------------------------	0-4	18-35	1.45-1.55	4.20-14.10	0.10-0.14	1.0-6.0	0.0-0.5
	4-15	35-50	1.25-1.45	0.42-1.40	0.11-0.13	1.0-6.0	0.3-0.7
	15-16	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
Rock outcrop.							
182:							
Luff--------------------------	0-4	6-20	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	4-10	6-20	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	10-22	40-60	1.25-1.45	0.42-1.40	0.11-0.13	3.0-9.0	0.3-0.7
	22-26	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	26-39	---	---	0.00-0.00	0.00-0.02	0.0-0.0	0.0-0.0
Haploxerepts------------------	0-3	5-18	1.45-1.55	14.00-42.00	0.10-0.13	2.0-6.0	0.0-0.5
	3-11	1-18	1.45-1.55	14.00-42.00	0.09-0.13	0.0-2.9	0.0-0.5
	11-19	10-27	1.25-1.45	0.42-1.40	0.11-0.18	0.0-12.0	0.3-0.7
	19-31	10-27	1.25-1.45	0.42-1.41	0.11-0.16	0.0-12.0	1.0-3.0
	31-41	0-10	1.25-1.45	0.42-1.41	0.06-0.08	0.0-12.0	1.0-3.0
	41-79	---	---	1.41-4.23	0.00-0.02	0.0-0.0	0.0-0.0
Haploxeralfs------------------	0-1	25-35	1.40-1.50	1.41-4.23	0.10-0.20	0.0-5.9	1.0-3.0
	1-16	40-50	1.35-1.45	0.42-14.10	0.08-0.15	0.0-5.9	0.5-1.5
	16-26	45-55	1.35-1.45	0.42-14.10	0.08-0.14	0.0-5.9	0.2-0.8
	26-39	40-50	1.35-1.45	0.42-14.10	0.08-0.14	0.0-5.9	0.0-0.5
	39-79	30-40	1.40-1.50	1.41-14.10	0.08-0.18	0.0-5.9	0.0-0.5
183:							
Purser------------------------	0-2	28-40	1.45-1.55	4.20-14.10	0.10-0.14	1.0-6.0	0.0-5.0
	2-15	35-50	1.25-1.45	0.42-1.40	0.11-0.13	1.0-6.0	0.3-0.7
	15-24	---	---	0.00-0.00	0.00-0.00	0.0-0.0	0.0-0.0
Luff--------------------------	0-2	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	2-4	6-20	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	4-13	6-20	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	13-22	40-60	1.25-1.45	0.42-1.40	0.11-0.13	6.0-12.0	0.3-0.7
	22-35	40-60	1.25-1.45	0.42-1.41	0.14-0.16	6.0-9.0	1.0-3.0
	35-79	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
184:							
Dewpoint----------------------	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	1-2	18-25	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	2-19	40-60	1.25-1.45	0.42-1.40	0.11-0.13	3.0-9.0	0.3-0.7
	19-24	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	24-29	30-60	1.25-1.45	0.42-1.41	0.14-0.16	5.0-12.0	1.0-3.0
	>29	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
Luff--------------------------	0-1	18-27	1.45-1.55	4.20-14.10	0.16-0.20	3.0-6.0	0.5-1.0
	1-6	40-60	1.45-1.55	0.42-1.41	0.14-0.19	3.0-9.0	1.0-4.0
	6-20	40-60	1.40-1.50	0.42-1.41	0.14-0.19	6.0-9.0	2.0-3.0
	20-39	---	---	0.00-0.00	0.00-0.02	0.0-0.0	0.0-0.0
185:							
Purser, coastal cliffs--------	0-4	18-27	1.45-1.55	4.20-14.10	0.10-0.14	1.0-6.0	0.0-0.5
	4-10	35-50	1.25-1.45	0.42-1.40	0.11-0.13	1.0-6.0	0.3-0.7
	10-14	35-50	1.25-1.45	0.42-1.40	0.11-0.13	1.0-6.0	0.3-0.7
	14-24	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
Rock outcrop, coastal cliffs.							

Table 9.--Physical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
190:							
Typic Xerofluvents-----------	0-2	---	0.05-0.30	42.00-141.00	0.00-0.00	0.0-0.0	30-70
	2-24	4-12	1.50-1.60	14.00-42.00	0.12-0.14	0.0-2.9	0.5-1.0
	24-39	1-3	1.60-1.70	42.00-141.00	0.03-0.06	0.0-2.9	0.0-0.5
	39-72	1-3	1.60-1.70	42.00-141.00	0.01-0.06	0.0-2.9	0.3-2.0
Riverwash.							
191:							
Typic Haploxerepts-----------	0-2	---	---	42.00-141.00	0.50-0.65	0-0-0.0	40-100
	2-8	2-6	1.45-1.55	141.00-423.00	0.03-0.08	0.0-3.0	0.0-3.0
	8-31	2-6	1.25-1.45	141.00-423.00	0.02-0.05	0.0-3.0	0.0-3.0
	31-65	2-6	1.25-1.45	42.00-141.00	0.05-0.08	0.0-3.0	0.0-0.7
	65-75	18-22	1.45-1.55	4.23-14.10	0.17-0.20	0.0-3.0	0.0-0.5
	75-83	18-22	1.45-1.55	4.23-14.10	0.14-0.20	0.0-3.0	0.0-0.5
Typic Xerofluvents-----------	0-1	---	0.05-0.30	42.00-141.00	0.00-0.00	0.0-0.0	30-100
	1-9	0-10	1.50-1.60	14.00-42.00	0.08-0.13	0.0-2.9	0.5-1.0
	9-26	0-10	1.60-1.70	42.00-141.00	0.03-0.06	0.0-2.9	0.0-0.5
	26-79	0-10	1.60-1.70	42.00-141.00	0.01-0.06	0.0-2.9	0.3-2.0
Argixerolls------------------	0-4	4-6	1.60-1.70	141.00-423.00	0.03-0.06	0.0-3.0	0.0-5.0
	4-16	4-6	1.60-1.75	141.00-423.00	0.03-0.06	0.0-3.0	0.0-1.0
	16-38	21-23	1.45-1.55	4.23-14.10	0.09-0.11	0.0-3.0	0.0-1.0
	38-59	22-24	1.45-1.55	4.23-14.10	0.11-0.16	0.0-3.0	0.0-2.0
293:							
Rock outcrop.							
Nauti------------------------	0-2	8-27	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	2.0-3.0
	2-7	27-40	1.40-1.50	1.40-4.00	0.07-0.14	0.0-2.9	0.0-0.5
	7-14	40-50	1.25-1.45	0.42-1.40	0.11-0.13	3.0-5.9	0.5-0.8
	14-31	27-40	1.40-1.50	0.42-1.41	0.15-0.19	3.0-5.9	1.0-3.0
	31-41	---	---	---	---	---	---
Haploxerepts-----------------	0-1	1-6	1.50-1.60	14.00-42.00	0.08-0.13	0.0-2.9	0.1-3.0
	1-8	6-8	1.50-1.60	14.00-42.00	0.10-0.13	0.0-3.0	0.5-1.5
	8-16	8-10	1.45-1.55	4.23-14.10	0.14-0.18	0.0-3.0	0.0-1.0
	16-79	---	---	---	---	---	---
400:							
Oboship----------------------	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	1-9	8-18	1.45-1.55	4.20-14.10	0.10-0.14	0.0-2.9	2.0-3.0
	9-22	18-34	1.45-1.55	4.20-14.10	0.10-0.14	0.0-2.9	1.0-4.0
	22-33	18-34	1.45-1.55	4.20-14.10	0.10-0.14	0.0-2.9	2.0-3.0
	33-60	18-34	1.45-1.55	4.20-14.10	0.10-0.14	0.0-2.9	2.0-3.0
	60-70	---	---	---	---	0.0-0.0	0.0-0.0
Nauti------------------------	0-2	8-27	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	2.0-3.0
	2-7	27-40	1.40-1.50	1.40-4.00	0.07-0.14	0.0-2.9	0.0-0.5
	7-14	40-50	1.25-1.45	0.42-1.40	0.11-0.13	3.0-5.9	0.5-0.8
	14-31	27-40	1.40-1.50	0.42-1.41	0.15-0.19	3.0-5.9	1.0-3.0
	31-41	---	---	---	---	---	---
Bosun------------------------	0-2	0-1	0.05-0.10	42.00-141.00	0.04-0.08	0.0-0.0	50-100
	2-6	---	0.05-0.30	42.00-141.00	0.08-0.15	0.0-0.0	30-100
	6-14	1-18	1.45-1.55	14.00-42.00	0.10-0.13	0.0-2.9	2.0-3.0
	14-24	18-34	1.45-1.55	4.20-14.10	0.10-0.12	0.0-2.9	1.0-4.0
	24-31	18-34	1.45-1.55	4.20-14.10	0.03-0.03	0.0-2.9	2.0-3.0
	31-47	18-34	1.45-1.55	4.20-14.10	0.02-0.02	0.0-2.9	2.0-3.0
	47-49	---	---	---	---	---	---

Table 9.--Physical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
407:							
Nauti------------------------	0-2	10-15	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	2.0-3.0
	2-8	14-20	1.45-1.55	4.20-14.10	0.13-0.18	0.0-2.9	1.0-3.0
	8-28	30-40	1.45-1.55	1.41-4.23	0.14-0.16	1.0-5.0	0.0-0.5
	28-34	32-42	1.45-1.55	0.42-1.41	0.14-0.16	1.0-5.0	0.0-0.5
	34-43	---	---	---	---	---	---
Flyer------------------------	0-4	0-15	1.45-1.55	42.30-141.00	0.06-0.07	0.0-2.9	2.0-3.0
	4-13	1-20	1.45-1.55	14.00-42.00	0.10-0.13	0.0-2.9	0.0-0.0
	13-28	8-27	1.45-1.55	4.20-14.10	0.11-0.12	0.0-2.9	0.0-0.0
	28-35	20-34	1.45-1.55	4.20-14.10	0.06-0.07	0.0-2.9	0.0-0.0
	35-39	---	---	---	---	---	---
Marpol-----------------------	0-1	8-27	1.45-1.55	4.20-14.10	0.13-0.18	0.0-2.9	2.0-3.0
	1-10	27-40	1.40-1.50	0.42-1.41	0.15-0.19	2.0-9.0	0.5-0.8
	10-28	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-0.9
	28-41	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-0.9
	41-45	---	---	---	---	---	---
410:							
Express----------------------	0-8	6-8	1.50-1.60	14.00-42.00	0.10-0.13	0.0-3.0	0.5-5.0
	8-20	8-10	1.45-1.55	4.20-14.10	0.13-0.18	0.0-3.0	1.0-3.0
	20-33	5-7	1.60-1.70	14.00-42.30	0.07-0.09	0.0-3.0	0.0-0.5
	33-43	---	---	0.00-0.00	---	---	---
Flyer------------------------	0-9	6-12	1.50-1.60	14.00-42.00	0.11-0.13	0.0-2.9	0.5-5.0
	9-16	10-14	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	0.0-0.5
	16-24	16-20	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	0.0-0.2
	24-33	---	---	0.00-0.00	---	---	---
Loadline---------------------	0-4	4-18	1.60-1.70	42.00-141.00	0.06-0.08	0.0-2.9	1.0-5.0
	4-16	7-15	1.50-1.60	14.00-42.00	0.10-0.14	0.0-2.9	0.5-5.0
	16-19	1-18	1.50-1.60	14.00-42.00	0.08-0.14	0.0-2.9	0.5-2.5
	19-29	---	---	0.00-0.00	---	---	---
411:							
Flyer------------------------	0-9	6-12	1.50-1.60	14.00-42.00	0.11-0.13	0.0-2.9	0.5-5.0
	9-16	10-14	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	0.0-0.5
	16-24	16-20	1.45-1.55	4.20-14.10	0.14-0.18	0.0-2.9	0.0-0.2
	24-31	---	---	0.00-0.00	---	---	---
Loadline---------------------	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	1-2	4-6	1.50-1.60	14.00-42.00	0.10-0.14	0.0-3.0	0.5-5.0
	2-8	8-10	1.50-1.60	14.00-42.00	0.13-0.15	0.0-3.0	0.5-5.0
	8-15	9-11	1.50-1.60	14.00-42.00	0.10-0.12	0.0-3.0	0.5-5.0
	15-18	---	---	0.00-0.00	---	---	---
Nauti------------------------	0-4	13-17	1.45-1.55	4.20-14.10	0.12-0.18	0.0-3.0	2.0-3.0
	4-10	39-43	1.40-1.50	0.01-0.10	0.14-0.17	2.0-6.0	1.0-2.0
	10-31	28-32	1.40-1.50	0.10-1.00	0.14-0.21	2.0-6.0	0.0-0.5
	31-35	8-12	1.50-1.60	1.00-10.00	0.10-0.14	0.0-3.0	0.0-0.5
	35-45	---	---	---	---	---	---
412:							
Flyer, gullied---------------	0-4	4-6	1.45-1.60	14.00-42.00	0.08-0.13	0.0-3.0	0.5-5.0
	4-9	8-12	1.60-1.70	14.00-42.00	0.06-0.08	0.0-3.0	0.0-0.2
	9-24	12-17	1.50-1.60	4.00-14.00	0.10-0.14	0.0-3.0	0.0-0.0
	24-33	---	---	0.00-0.00	---	---	---

Table 9.--Physical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
412:							
Express, gullied	0-14	6-10	1.50-1.60	14.00-42.00	0.10-0.13	0.0-3.0	0.5-5.0
	14-30	1-15	1.50-1.60	14.00-42.00	0.08-0.13	0.0-3.0	1.0-3.0
	30-41	8-12	1.45-1.55	10.00-100.00	0.05-0.06	0.0-3.0	0.0-0.5
	41-43	---	---	0.00-0.00	---	---	---
Bosun	0-2	0-1	0.05-0.10	42.00-141.00	0.04-0.10	0.0-0.0	50-100
	2-3	---	0.05-0.10	42.00-141.00	0.05-0.11	0.0-0.0	30-100
	3-12	1-18	1.50-1.60	14.00-42.00	0.09-0.13	0.0-2.9	2.0-6.0
	12-22	17-23	1.45-1.55	4.23-14.11	0.11-0.13	0.0-3.0	0.5-1.5
	22-33	17-26	1.45-1.55	4.23-14.11	0.06-0.09	0.0-2.0	0.2-1.0
	33-43	12-18	1.50-1.60	4.23-14.11	0.08-0.12	0.0-3.0	0.0-0.5
	43-45	---	---	---	---	---	---
420:							
Masthead	0-1	8-18	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	1-6	8-18	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	6-12	27-40	1.40-1.50	0.42-1.41	0.15-0.19	6.0-9.0	0.5-0.8
	12-28	40-60	1.40-1.50	0.42-1.41	0.15-0.19	6.0-9.0	0.5-0.8
	28-33	---	---	---	---	---	---
Luff	0-2	18-27	1.45-1.55	4.20-14.10	0.10-0.14	3.0-6.0	0.0-0.5
	2-7	18-27	1.25-1.45	0.42-1.40	0.11-0.13	3.0-12.0	0.3-0.7
	7-22	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-9.0	1.0-3.0
	22-24	---	---	1.41-4.23	0.01-0.02	0.0-0.0	0.0-0.0
421:							
Masthead	0-1	8-18	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	1-6	8-18	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	6-12	27-40	1.40-1.50	0.42-1.41	0.15-0.19	2.0-7.0	0.5-0.8
	12-28	40-60	1.40-1.50	0.42-1.41	0.15-0.19	2.0-7.0	0.5-0.8
	28-33	---	---	---	---	---	---
Luff	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	1-3	10-14	1.45-1.55	1.00-10.00	0.14-0.18	0.0-3.0	2.0-6.0
	3-9	32-38	1.40-1.50	0.10-1.00	0.17-0.21	5.0-9.0	1.0-4.0
	9-24	42-48	1.35-1.45	0.10-1.00	0.14-0.16	5.0-9.0	1.0-3.0
	24-47	42-48	1.35-1.45	0.10-1.00	0.14-0.16	5.0-9.0	1.0-2.0
	47-51	---	---	---	---	---	---
422:							
Dewpoint	0-1	0-1	0.05-0.10	42.00-141.00	---	0.0-0.0	50-100
	1-6	4-18	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	6-11	8-18	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	11-18	28-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	1.0-3.0
	18-33	27-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	1.0-3.0
	33-43	---	---	---	---	---	---
Masthead	0-2	15-27	1.45-1.55	4.20-14.10	0.17-0.19	0.0-2.9	1.0-3.0
	2-24	40-60	1.40-1.50	0.42-1.41	0.15-0.19	3.0-9.0	0.5-0.8
	24-33	---	---	---	---	---	---
Coastwise	0-1	8-27	1.45-1.55	4.20-14.10	0.12-0.18	0.0-2.9	2.0-3.0
	1-4	4-27	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	4-10	27-40	1.40-1.50	0.42-1.41	0.15-0.19	6.0-9.0	0.5-0.8
	10-19	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-0.9
	>19	---	---	---	---	---	---

Table 9.--Physical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
423:							
Masthead----------------------	0-4	5-27	1.45-1.55	4.23-14.11	0.15-0.17	0.0-3.0	1.0-3.0
	4-11	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-5.9	0.5-1.0
	11-30	40-60	1.25-1.45	0.42-1.40	0.11-0.13	3.0-5.9	0.5-0.8
	30-31	---	---	---	---	---	---
Coastwise---------------------	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.00	0.0-0.0	50-100
	1-6	1-12	1.45-1.55	14.00-42.00	0.09-0.13	0.0-2.9	2.0-3.0
	6-15	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-0.9
	15-18	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-0.9
	18-20	---	---	---	---	---	---
Dewpoint----------------------	0-1	0-1	0.05-0.10	42.00-141.00	0.00-0.10	0.0-0.0	50-100
	1-4	0-1	0.05-0.10	42.00-141.00	0.00-0.10	0.0-0.0	50-100
	4-7	16-20	1.45-1.55	4.00-14.00	0.09-0.12	0.0-2.9	1.0-3.0
	7-13	6-10	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	13-26	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-0.9
	26-30	27-50	1.45-1.55	0.42-1.41	0.14-0.16	0.0-2.9	0.4-0.6
	30-39	---	---	---	---	---	---
424:							
Masthead----------------------	0-10	18-27	1.45-1.55	4.23-14.11	0.15-0.17	0.0-2.9	1.0-3.0
	10-26	40-60	1.25-1.45	0.42-1.41	0.14-0.16	2.0-5.9	0.5-1.0
	26-53	40-60	1.25-1.45	0.42-1.40	0.11-0.16	2.0-5.9	0.5-0.8
	53-79	40-60	1.25-1.45	0.42-1.40	0.11-0.13	3.0-5.9	0.5-0.8
Dewpoint----------------------	0-2	0-1	0.05-0.10	42.00-141.00	0.00-0.08	0.0-0.0	50-100
	2-4	0-1	0.05-0.10	42.00-141.00	0.00-0.10	0.0-0.0	50-100
	4-9	8-18	1.45-1.55	4.00-14.00	0.20-0.22	1.0-2.9	1.0-3.0
	9-13	8-18	1.45-1.55	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0
	13-26	40-60	1.25-1.45	0.42-1.41	0.14-0.16	1.0-3.0	0.5-0.9
	26-35	27-60	1.45-1.55	0.42-1.41	0.14-0.16	0.0-2.9	0.4-0.6
	35-45	---	---	---	---	---	---
Rock outcrop.							
425:							
Coastwise, cobbly------------	0-5	5-27	1.45-1.55	4.23-14.11	0.15-0.17	0.5-5.0	1.0-3.0
	5-17	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-1.0
	17-20	---	---	---	---	---	---
Masthead, cobbly-------------	0-1	5-27	1.45-1.55	4.23-14.11	0.15-0.17	1.0-4.0	1.0-3.0
	1-6	5-27	1.45-1.55	4.23-14.11	0.15-0.17	1.0-4.0	1.0-3.0
	6-16	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-6.0	0.5-1.0
	16-30	40-60	1.25-1.45	0.42-1.40	0.11-0.13	3.0-5.9	0.5-0.8
	30-35	---	---	---	---	---	---
427:							
Masthead----------------------	0-1	5-27	1.45-1.55	4.23-14.11	0.15-0.17	0.0-3.0	1.0-3.0
	1-6	5-27	1.45-1.55	4.23-14.11	0.15-0.17	3.0-5.9	1.0-3.0
	6-24	40-60	1.25-1.45	0.42-1.41	0.14-0.16	3.0-5.9	0.5-1.0
	24-31	40-60	1.25-1.45	0.42-1.40	0.11-0.13	3.0-5.9	0.5-0.8
	31-33	---	---	---	---	---	---
Coastwise, cobbly------------	0-6	1-12	1.45-1.55	14.00-42.00	0.08-0.12	0.0-2.9	2.0-3.0
	6-15	27-40	1.40-1.50	0.42-1.41	0.15-0.19	1.0-5.0	0.5-0.8
	15-16	---	---	---	---	---	---

Table 9.--Physical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
427:							
Typic Haploxeralfs-----------	0-1	0-2	0.05-0.10	46.00-141.00	0.04-0.08	0.0-0.0	60-100
	1-2	6-10	1.45-1.55	14.00-42.00	0.10-0.13	0.0-3.0	1.0-2.0
	2-7	7-11	1.50-1.60	14.00-42.00	0.08-0.13	0.0-3.0	0.5-1.5
	7-15	16-20	1.45-1.55	4.00-14.00	0.11-0.14	2.0-2.9	0.2-1.2
	15-23	20-24	1.45-1.55	4.00-14.00	0.08-0.10	2.0-2.9	0.2-1.2
	23-39	---	---	---	---	---	---
450:							
Urban land.							
Xerorthents, landscaped------	0-2	3-9	1.45-1.55	14.00-42.00	0.08-0.12	0.0-2.0	1.0-10
	2-12	23-27	1.45-1.55	4.00-14.00	0.15-0.16	0.0-3.0	0.0-0.5
	12-59	28-32	1.40-1.50	1.40-4.20	0.15-0.18	0.0-3.0	0.0-0.2
	59-79	8-12	1.60-1.70	14.00-42.00	0.06-0.08	0.0-3.0	0.0-0.2
451:							
Nauti, landscaped------------	0-7	8-27	1.45-1.55	4.20-14.10	0.17-0.19	0.0-2.9	2.0-3.0
	7-16	27-40	1.40-1.50	1.40-4.00	0.07-0.14	0.0-2.9	0.0-0.5
	16-24	40-50	1.25-1.45	0.42-1.40	0.11-0.13	0.0-2.9	0.5-0.8
	24-30	27-40	1.40-1.50	0.42-1.41	0.15-0.19	0.0-2.9	1.0-3.0
	30-39	---	---	---	---	---	---
Urban land.							
453:							
Typic Argixerolls------------	0-2	10-14	1.45-1.55	4.00-14.00	0.18-0.20	0.0-3.0	1.0-3.0
	2-11	18-22	1.45-1.55	4.00-14.00	0.18-0.20	0.0-3.0	0.6-3.0
	11-26	40-49	1.35-1.45	0.42-1.40	0.14-0.16	1.0-6.0	0.5-1.5
	26-59	50-59	1.25-1.35	0.42-1.40	0.14-0.15	1.0-6.0	0.2-0.8
Urban land, landscaped.							
454:							
Typic Argixerolls, landscaped	0-1	0-1	0.05-0.10	42.00-141.00	---	---	35-100
	1-5	8-27	1.45-1.55	4.00-14.00	0.11-0.14	0.0-3.0	2.0-5.0
	5-16	28-32	1.40-1.50	1.40-4.20	0.15-0.19	3.0-6.0	1.0-3.0
	16-37	13-17	1.55-1.60	4.00-14.00	0.07-0.11	0.0-3.0	0.5-2.0
	37-63	19-23	1.45-1.55	4.00-14.00	0.14-0.18	0.0-3.0	0.2-0.8
Calcic Haploxerolls, landscaped------------------	0-1	0-1	0.05-0.10	42.00-141.00	---	---	35-100
	1-3	12-27	1.40-1.50	4.20-14.10	0.13-0.18	0.0-3.0	1.0-3.0
	3-10	18-28	1.40-1.50	4.20-14.10	0.13-0.17	0.0-3.0	0.5-1.5
	10-19	18-28	1.45-1.55	4.20-14.10	0.13-0.17	0.0-3.0	0.5-1.5
	19-26	1-18	1.50-1.60	14.00-42.00	0.09-0.14	0.0-2.9	0.5-1.5
	26-47	12-27	1.45-1.55	4.20-14.10	0.14-0.18	0.0-3.0	0.2-0.8
	47-61	2-12	1.60-1.70	10.00-100.00	0.05-0.07	0.0-3.0	0.0-0.5
Urban land, landscaped.							
456:							
Typic Xerorthents, fill------	0-4	0-9	1.45-1.55	4.00-14.00	0.12-0.15	0.0-3.0	0.0-1.0
	4-61	0-11	1.45-1.55	4.00-14.00	0.09-0.12	0.0-3.0	0.0-0.5
	61-79	0-12	1.45-1.55	4.00-14.00	0.08-0.11	0.0-3.0	0.0-0.2
Typic Xerorthents, steep fill	0-6	6-10	1.45-1.55	4.00-14.00	0.15-0.20	0.0-3.0	0.0-1.0
	6-79	8-12	1.45-1.55	4.00-14.00	0.15-0.20	0.0-3.0	0.0-0.5
DAM.							
Dam							

Table 9.--Physical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter
	In	Pct	g/cc	um/sec	In/in	Pct	Pct
GP. Gravel pits							
W. Water							

Table 10.--Erosion Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer)

Map symbol and component name	Depth	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In					
156:						
Tongva	0-1	.02	.02	3	5	56
	1-4	.37	.37			
	4-16	.37	.37			
	16-30	.32	.32			
	30-31	---	---			
Freeboard	0-1	.24	.28	2	3	86
	1-5	.20	.37			
	5-11	.10	.15			
	11-24	.15	.15			
	24-35	.15	.15			
	35-51	.15	.15			
	51-59	---	---			
Starbright	0-2	---	---	3	3	86
	2-8	.20	.37			
	8-12	.10	.15			
	12-16	.15	.15			
	16-28	.15	.15			
	28-33	.15	.15			
	33-43	.15	.15			
	43-53	---	---			
157:						
Tongva	0-1	.37	.37	3	5	56
	1-4	.37	.37			
	4-11	.32	.32			
	11-21	.17	.32			
	21-26	.17	.32			
	26-36	---	---			
Pachic Argixerolls	0-2	.20	.37	3	3	86
	2-7	.20	.37			
	7-16	.05	.15			
	16-35	.02	.15			
	35-39	---	---			
Freeboard	0-1	---	---	3	3	86
	1-8	.20	.37			
	8-35	.10	.15			
	35-41	.15	.15			
	41-43	.15	.15			
	43-47	---	---			
160:						
Beaches.						
Abaft	0-5	.17	.17	5	2	134
	5-13	.17	.17			
	13-59	.17	.17			
181:						
Haploxerepts	0-1	.20	.37	3	3	86
	1-16	.10	.15			
	16-30	.15	.15			
	30-79	---	---			

Table 10.--Erosion Properties of the Soils--Continued

Map symbol and component name	Depth	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In					
181:						
Purser	0-4	.20	.37	1	3	86
	4-15	.10	.15			
	15-16	---	---			
Rock outcrop.						
182:						
Luff	0-4	.20	.37	1	6	48
	4-10	.20	.37			
	10-22	.10	.15			
	22-26	.15	.15			
	26-39	---	---			
Haploxerepts	0-3	.20	.37	3	2	86
	3-11	.20	.37			
	11-19	.10	.15			
	19-31	.15	.15			
	31-41	.15	.15			
	41-79	---	---			
Haploxeralfs	0-1	.32	.37	3	2	86
	1-16	.24	.28			
	16-26	.20	.28			
	26-39	.20	.28			
	39-79	.24	.37			
183:						
Purser	0-2	.20	.37	1	3	86
	2-15	.10	.15			
	15-24	---	---			
Luff	0-2	---	---	1	6	48
	2-4	.20	.37			
	4-13	.20	.37			
	13-22	.10	.15			
	22-35	.15	.15			
	35-79	---	---			
184:						
Dewpoint	0-1	---	---	3	3	86
	1-2	.20	.37			
	2-19	.10	.15			
	19-24	.15	.15			
	24-29	.15	.15			
	>29	---	---			
Luff	0-1	.37	.37	1	6	48
	1-6	.37	.37			
	6-20	.32	.32			
	20-39	---	---			
185:						
Purser, coastal cliffs	0-4	.20	.37	1	3	86
	4-10	.10	.15			
	10-14	.10	.15			
	14-24	---	---			
Rock outcrop, coastal cliffs.						

Table 10.--Erosion Properties of the Soils--Continued

Map symbol and component name	Depth	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In					
190:						
Typic Xerofluvents	0-2	---	---	5	3	86
	2-24	.24	.24			
	24-39	.02	.17			
	39-72	.02	.17			
Riverwash.						
191:						
Typic Haploxerepts	0-2	.02	.05	5	1	134
	2-8	.02	.05			
	8-31	.02	.05			
	31-65	.05	.28			
	65-75	.43	.43			
	75-83	.10	.43			
Typic Xerofluvents	0-1	.05	.05	5	1	134
	1-9	.17	.24			
	9-26	.02	.17			
	26-79	.02	.17			
Argixerolls	0-4	.05	.10	5	1	134
	4-16	.05	.10			
	16-38	.15	.32			
	38-59	.28	.32			
293:						
Rock outcrop.						
Nauti	0-2	.37	.37	3	5	56
	2-7	.15	.32			
	7-14	.10	.15			
	14-31	.32	.32			
	31-41	---	---			
Haploxerepts	0-1	.32	.43	3	5	56
	1-8	.32	.43			
	8-16	.32	.43			
	16-79	---	---			
400:						
Oboship	0-1	---	---	3	5	56
	1-9	.20	.37			
	9-22	.20	.37			
	22-33	.20	.37			
	33-60	.20	.37			
	60-70	---	---			
Nauti	0-2	.37	.37	3	5	56
	2-7	.15	.32			
	7-14	.10	.15			
	14-31	.32	.32			
	31-41	---	---			
Bosun	0-2	---	---	4	3	86
	2-6	---	---			
	6-14	.20	.37			
	14-24	.20	.37			
	24-31	.20	.37			
	31-47	.20	.37			
	47-49	---	---			

Table 10.--Erosion Properties of the Soils--Continued

Map symbol and component name	Depth	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In					
407:						
Nauti	0-2	.37	.43	2	5	56
	2-8	.37	.43			
	8-28	.43	.55			
	28-34	.32	.55			
	34-43	---	---			
Flyer	0-4	.20	.37	2	2	134
	4-13	.20	.37			
	13-28	.15	.37			
	28-35	.05	.37			
	35-39	---	---			
Marpol	0-1	.37	.37	5	5	56
	1-10	.32	.32			
	10-28	.15	.15			
	28-41	.15	.15			
	41-45	---	---			
410:						
Express	0-8	.20	.24	4	3	86
	8-20	.49	.55			
	20-33	.24	.32			
	33-43	---	---			
Flyer	0-9	.43	.43	3	3	86
	9-16	.55	.55			
	16-24	.55	.55			
	24-33	---	---			
Loadline	0-4	.28	.28	5	3	86
	4-16	.28	.37			
	16-19	.24	.43			
	19-29	---	---			
411:						
Flyer	0-9	.43	.43	5	3	86
	9-16	.55	.55			
	16-24	.55	.55			
	24-31	---	---			
Loadline	0-1	---	---	5	3	86
	1-2	.43	.43			
	2-8	.37	.37			
	8-15	.32	.37			
	15-18	---	---			
Nauti	0-4	.55	.55	5	3	86
	4-10	.28	.28			
	10-31	.37	.37			
	31-35	.32	.32			
	35-45	---	---			
412:						
Flyer, gullied	0-4	.32	.32	2	3	86
	4-9	.28	.28			
	9-24	.28	.28			
	24-33	---	---			

Table 10.--Erosion Properties of the Soils--Continued

Map symbol and component name	Depth	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In					
412:						
Express, gullied	0-14	.28	.32	4	3	86
	14-30	.24	.37			
	30-41	.10	.43			
	41-43	---	---			
Bosun	0-2	---	---	4	3	86
	2-3	---	---			
	3-12	.15	.24			
	12-22	.15	.28			
	22-33	.10	.28			
	33-43	.02	.24			
	43-45	---	---			
420:						
Masthead	0-1	.43	.43	5	3	86
	1-6	.43	.43			
	6-12	.32	.32			
	12-28	.32	.32			
	28-33	---	---			
Luff	0-2	.20	.37	1	6	48
	2-7	.10	.15			
	7-22	.15	.15			
	22-24	---	---			
421:						
Masthead	0-1	.43	.43	3	5	56
	1-6	.43	.43			
	6-12	.32	.32			
	12-28	.32	.32			
	28-33	---	---			
Luff	0-1	---	---	1	6	48
	1-3	.28	.37			
	3-9	.32	.32			
	9-24	.28	.28			
	24-47	.28	.28			
	47-51	---	---			
422:						
Dewpoint	0-1	---	---	5	3	86
	1-6	.20	.43			
	6-11	.20	.43			
	11-18	.05	.15			
	18-33	.10	.15			
	33-43	---	---			
Masthead	0-2	.43	.43	5	6	48
	2-24	.32	.32			
	24-33	---	---			
Coastwise	0-1	.28	.37	5	5	56
	1-4	.43	.43			
	4-10	.32	.32			
	10-19	.15	.15			
	>19	---	---			

Table 10.--Erosion Properties of the Soils--Continued

Map symbol and component name	Depth	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In					
423:						
Masthead	0-4	.24	.43	3	5	56
	4-11	.15	.15			
	11-30	.10	.15			
	30-31	---	---			
Coastwise	0-1	---	---	2	3	86
	1-6	.15	.24			
	6-15	.15	.15			
	15-18	.15	.15			
	18-20	---	---			
Dewpoint	0-1	---	---	5	6	48
	1-4	---	---			
	4-7	.43	.43			
	7-13	.20	.43			
	13-26	.15	.15			
	26-30	.24	.43			
	30-39	---	---			
424:						
Masthead	0-10	.24	.43	5	7	38
	10-26	.15	.15			
	26-53	.10	.15			
	53-79	.10	.15			
Dewpoint	0-2	---	---	3	3	86
	2-4	---	---			
	4-9	.43	.43			
	9-13	.43	.43			
	13-26	.15	.15			
	26-35	.24	.43			
	35-45	---	---			
Rock outcrop.						
425:						
Coastwise, cobbly	0-5	.24	.43	2	8	0
	5-17	.15	.15			
	17-20	---	---			
Masthead, cobbly	0-1	.24	.43	3	7	56
	1-6	.24	.43			
	6-16	.10	.15			
	16-30	.02	.15			
	30-35	---	---			
427:						
Masthead	0-1	.24	.43	3	5	56
	1-6	.24	.43			
	6-24	.15	.15			
	24-31	.10	.15			
	31-33	---	---			
Coastwise, cobbly	0-6	.15	.24	5	8	0
	6-15	.32	.32			
	15-16	---	---			

Table 10.--Erosion Properties of the Soils--Continued

Map symbol and component name	Depth	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In					
427:						
Typic Haploxeralfs	0-1	.02	.02	4	3	86
	1-2	.49	.55			
	2-7	.37	.55			
	7-15	.17	.32			
	15-23	.10	.32			
	23-39	---	---			
450:						
Urban land.						
Xerorthents, landscaped	0-2	.20	.24	5	3	86
	2-12	.10	.10			
	12-59	.10	.10			
	59-79	.10	.10			
451:						
Nauti, landscaped	0-7	.37	.37	3	6	48
	7-16	.15	.32			
	16-24	.10	.15			
	24-30	.20	.32			
	30-39	---	---			
Urban land.						
453:						
Typic Argixerolls	0-2	.37	.49	5	3	86
	2-11	.32	.43			
	11-26	.24	.28			
	26-59	.20	.24			
Urban land, landscaped.						
454:						
Typic Argixerolls, landscaped	0-1	---	---	5	5	56
	1-5	.24	.43			
	5-16	.24	.32			
	16-37	.15	.24			
	37-63	.24	.32			
Calcic Haploxerolls, landscaped	0-1	---	---	5	5	56
	1-3	.17	.20			
	3-10	.17	.20			
	10-19	.17	.20			
	19-26	.24	.37			
	26-47	.32	.37			
	47-61	.28	.37			
Urban land, landscaped.						
456:						
Typic Xerorthents, fill	0-4	.37	.64	5	5	56
	4-61	.24	.64			
	61-79	.24	.64			
Typic Xerorthents, steep fill	0-6	.32	.55	5	5	56
	6-79	.20	.55			
DAM.						
Dam						

Table 10.--Erosion Properties of the Soils--Continued

Map symbol and component name	Depth	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
		Kw	Kf	T		
	In					
GP.						
Gravel pits						
W.						
Water						

Table 11.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated)

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
156:					
Tongva	0-1	0-2	0.0-0.0	5.5-6.5	0
	1-4	12-27	11-23	6.6-7.3	0
	4-16	12-27	11-23	6.6-7.3	0
	16-30	27-40	21-31	5.1-5.5	0
	30-31	---	---	---	0
Freeboard	0-1	28-36	22-29	6.8-7.2	0
	1-5	35-45	26-35	6.9-7.3	0
	5-11	24-44	19-33	7.1-7.5	0
	11-24	25-35	19-27	7.3-7.7	0-1
	24-35	18-26	13-20	8.1-8.5	0-1
	35-51	12-20	9.3-16	8.5-8.9	0-1
	51-59	---	---	---	0
Starbright	0-2	0-1	65-103	5.6-6.5	0
	2-8	5-25	3.4-14	6.6-7.3	0
	8-12	25-50	17-32	6.6-7.3	0
	12-16	38-50	26-52	6.6-7.3	0
	16-28	38-50	26-52	6.6-7.3	0
	28-33	30-50	26-52	6.6-7.3	0
	33-43	30-50	26-52	6.6-7.3	0
	43-53	---	---	---	0
157:					
Tongva	0-1	0-1	65-103	6.6-7.3	0
	1-4	12-27	11-23	6.6-7.3	0
	4-11	15-40	12-31	5.1-5.5	0
	11-21	27-40	19-30	6.6-7.3	0
	21-26	18-35	13-27	6.6-7.3	0
	26-36	---	---	---	0
Pachic Argixerolls	0-2	5-15	3.8-10	6.6-7.3	0
	2-7	7-17	5.2-12	6.6-7.3	0
	7-16	25-35	17-23	6.6-7.3	0
	16-35	12-18	11-17	6.6-7.3	0
	35-39	---	---	---	0
Freeboard	0-1	0-1	65-103	5.6-6.5	0
	1-8	18-27	13-21	6.6-7.3	0
	8-35	35-45	26-33	6.6-7.3	0
	35-41	25-35	20-28	6.6-7.3	0
	41-43	20-30	17-24	6.6-7.3	0
	43-47	---	---	---	0
160:					
Beaches.					
Abaft	0-5	1-8	1.0-6.4	6.6-7.3	0
	5-13	1-8	1.0-6.4	6.6-7.3	0
	13-59	1-8	0.8-6.1	6.6-7.3	0
181:					
Haploxerepts	0-1	0-10	3.4-14	6.6-7.3	0
	1-16	1-10	17-32	6.6-7.3	0
	16-30	1-10	26-52	6.6-7.3	0
	30-79	---	---	---	0

Table 11.--Chemical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
181:					
Purser	0-4	18-35	3.4-14	6.6-7.3	0
	4-15	35-50	17-32	6.6-7.3	0
	15-16	---	---	---	0
Rock outcrop.					
182:					
Luff	0-4	6-20	3.4-14	6.6-7.3	0
	4-10	6-20	3.4-14	6.6-7.3	0
	10-22	40-60	17-32	6.6-7.3	0
	22-26	40-60	26-52	6.6-7.3	0
	26-39	---	---	---	0
Haploxerepts	0-3	5-18	3.4-14	6.6-7.3	0
	3-11	1-18	3.4-14	6.6-7.3	0
	11-19	10-27	17-32	6.6-7.3	0
	19-31	10-27	26-52	6.6-7.3	0
	31-41	0-10	26-52	6.6-7.3	0
	41-79	---	---	---	0
Haploxeralfs	0-1	25-35	15-24	6.2-6.6	0
	1-16	40-50	20-28	6.4-6.8	0
	16-26	45-55	24-28	6.4-6.8	0
	26-39	40-50	21-26	6.6-7.0	0
	39-79	30-40	16-21	6.6-7.0	0
183:					
Purser	0-2	28-40	3.4-14	6.0-7.3	0
	2-15	35-50	17-32	6.6-7.3	0
	15-24	---	---	---	0
Luff	0-2	0-1	65-103	5.0-5.5	0
	2-4	6-20	3.4-14	6.6-7.3	0
	4-13	6-20	3.4-14	6.6-7.3	0
	13-22	40-60	17-32	6.6-7.3	1-6
	22-35	40-60	26-52	6.6-7.3	0
	35-79	---	---	---	0
184:					
Dewpoint	0-1	0-1	65-103	5.6-6.5	0
	1-2	18-25	13-20	6.6-7.3	0
	2-19	40-60	29-42	6.6-7.3	0
	19-24	40-60	30-44	6.6-7.3	0
	24-29	30-60	23-44	6.6-7.3	0
	>29	---	---	---	0
Luff	0-1	18-27	15-22	6.1-6.5	0
	1-6	40-60	15-23	6.1-6.5	0
	6-20	40-60	22-32	6.6-7.3	0
	20-39	---	---	---	0
185:					
Purser, coastal cliffs	0-4	18-27	3.4-14	6.6-7.3	0
	4-10	35-50	17-32	6.6-7.3	0
	10-14	35-50	17-32	6.6-7.3	0
	14-24	---	---	---	0
Rock outcrop, coastal cliffs.					

Table 11.--Chemical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
190:					
Typic Xerofluvents	0-2	0	65-103	5.6-6.5	0
	2-24	4-12	3.3-9.1	6.6-7.3	0
	24-39	1-3	0.8-2.6	6.6-7.3	0
	39-72	1-3	0.9-2.9	6.6-7.3	0
Riverwash.					
191:					
Typic Haploxerepts	0-2	0	65-103	5.6-6.5	0
	2-8	2-6	1.0-3.3	6.6-7.3	0
	8-31	2-6	1.0-3.3	6.6-7.3	0
	31-65	2-6	1.0-3.3	6.6-7.3	0
	65-75	18-22	9.1-12	6.8-7.2	0
	75-83	18-22	9.1-12	6.8-7.2	0
Typic Xerofluvents	0-1	0	65-103	5.6-6.5	0
	1-9	0-10	3.3-9.1	6.6-7.3	0
	9-26	0-10	0.8-2.6	6.6-7.3	0
	26-79	0-10	0.9-2.9	6.6-7.3	0
Argixerolls	0-4	4-6	2.8-7.4	6.3-7.3	0
	4-16	4-6	3.1-4.5	6.0-7.5	0
	16-38	21-23	14-16	6.0-7.5	0
	38-79	22-24	11-20	6.0-7.5	0
293:					
Rock outcrop.					
Nauti	0-2	8-27	7.5-23	6.6-7.3	0
	2-7	27-40	19-30	5.6-8.0	0
	7-14	40-50	30-38	6.6-7.6	0
	14-31	27-40	22-32	7.4-7.8	0
	31-41	---	---	---	---
Haploxerepts	0-1	1-6	0.9-5.7	6.0-7.3	0
	1-8	6-8	4.5-6.5	6.6-7.3	0
	8-16	8-10	3.6-7.3	6.6-7.8	0
	16-79	---	---	---	---
400:					
Oboship	0-1	0-1	65-103	5.5-6.2	0
	1-9	8-18	7.5-16	6.6-7.3	0
	9-22	18-34	15-28	6.1-6.5	0
	22-33	18-34	16-28	6.6-7.3	0
	33-60	18-34	16-28	6.6-7.3	0
	60-70	---	---	---	0
Nauti	0-2	8-27	7.5-23	6.6-7.3	0
	2-7	27-40	19-30	5.6-8.0	0
	7-14	40-50	30-38	6.6-7.6	0
	14-31	27-40	22-32	7.4-7.8	0
	31-41	---	---	---	---
Bosun	0-2	0-1	65-103	5.5-6.2	0
	2-6	0-1	51-135	5.5-6.2	0
	6-14	1-18	7.5-16	6.4-6.8	0
	14-24	18-34	15-23	7.0-7.4	0
	24-31	18-34	16-23	7.2-7.6	0
	31-47	18-34	16-28	7.2-7.6	0
	47-49	---	---	---	---

Table 11.--Chemical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
407:					
Nauti	0-2	10-15	9.1-13	5.9-6.3	0
	2-8	14-20	12-17	6.2-6.6	0
	8-28	30-40	20-30	6.4-6.8	0
	28-34	32-42	22-32	6.8-7.2	0
	34-43	---	---	---	---
Flyer	0-4	0-15	7.5-16	5.2-5.6	0
	4-13	1-20	15-23	5.5-5.9	0
	13-28	8-27	16-23	6.1-6.5	0
	28-35	20-34	16-23	6.2-6.6	0
	35-39	---	---	---	---
Marpol	0-1	8-27	7.5-23	6.6-7.3	0
	1-10	27-40	14-21	6.6-7.3	0
	10-28	40-60	20-35	7.4-7.8	0
	28-41	40-60	20-35	7.4-7.8	0
	41-45	---	---	---	---
410:					
Express	0-8	6-8	3.2-4.4	6.1-6.5	0
	8-20	8-10	4.3-5.5	6.2-6.6	0
	20-33	5-7	2.6-3.8	6.3-6.7	0
	33-43	---	---	---	---
Flyer	0-9	6-12	3.2-6.6	5.5-6.2	0
	9-16	10-14	5.1-7.5	5.7-6.5	0
	16-24	16-20	8.1-11	6.3-6.5	0
	24-33	---	---	---	---
Loadline	0-4	4-18	2.2-9.9	6.5-6.9	0
	4-16	7-15	3.8-8.3	6.7-7.1	0
	16-19	1-18	0.6-9.8	6.7-7.1	0
	19-29	---	---	---	---
411:					
Flyer	0-9	6-12	3.2-6.6	5.5-6.2	0
	9-16	10-14	5.1-7.5	5.7-6.5	0
	16-24	16-20	8.1-10	6.3-6.5	0
	24-31	---	---	---	---
Loadline	0-1	0-1	65-103	5.5-6.2	0
	1-2	4-6	2.2-3.3	6.3-6.7	0
	2-8	8-10	4.3-5.5	6.5-6.9	0
	8-15	9-11	4.8-6.1	6.5-6.9	0
	15-18	---	---	---	---
Nauti	0-4	13-17	12-15	6.7-7.1	0
	4-10	39-43	30-34	7.1-7.4	0
	10-31	28-32	19-25	7.1-7.4	0
	31-35	8-12	6.2-10	7.1-7.5	0
	35-45	---	---	---	0
412:					
Flyer, gullied	0-4	4-6	2.2-3.3	5.8-6.2	0
	4-9	8-12	4.1-6.3	6.0-6.4	0
	9-24	12-17	6.1-8.6	6.2-6.6	0
	24-33	---	---	---	---

Table 11.--Chemical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
412:					
Express, gullied	0-14	6-10	3.2-5.5	6.1-6.5	0
	14-30	1-15	0.6-8.2	6.2-6.6	0
	30-41	8-12	4.1-6.4	6.3-6.7	0
	41-43	---	---	---	---
Bosun	0-2	0-1	65-103	5.5-6.2	0
	2-3	0-1	50-136	5.5-6.5	0
	3-12	1-18	1.1-16	5.7-6.1	0
	12-22	17-23	14-19	6.1-6.5	0
	22-33	17-26	14-21	6.5-6.9	0
	33-43	12-18	8.9-15	6.9-7.3	0
	43-45	---	---	---	---
420:					
Masthead	0-1	8-18	7.5-16	6.1-6.5	0
	1-6	8-18	7.5-16	6.1-6.5	0
	6-12	27-40	21-30	6.6-7.3	0
	12-28	40-60	29-42	6.6-7.3	0
	28-33	---	---	---	---
Luff	0-2	18-27	3.4-14	6.6-7.3	0
	2-7	18-27	17-32	6.6-7.3	0
	7-22	40-60	26-52	6.6-7.3	0
	22-31	---	---	---	0
421:					
Masthead	0-1	8-18	7.5-16	6.1-6.5	0
	1-6	8-18	7.5-16	6.1-6.5	0
	6-12	27-40	21-30	6.6-7.3	0
	12-28	40-60	29-42	6.6-7.3	0
	28-33	---	---	---	---
Luff	0-1	0-1	65-103	5.0-6.0	0
	1-3	10-14	9.3-13	5.8-6.2	0
	3-9	32-38	25-30	6.0-6.4	0
	9-24	42-48	31-37	6.2-6.6	0
	24-47	42-48	31-36	6.4-6.8	0
	47-51	---	---	---	---
422:					
Dewpoint	0-1	0-1	65-103	5.0-6.0	0
	1-6	4-18	4.1-16	5.6-6.0	0
	6-11	8-18	7.5-16	6.1-6.5	0
	11-18	28-60	22-44	7.0-8.2	0
	18-33	27-60	21-44	7.0-8.2	0-5
	33-43	---	---	---	---
Masthead	0-2	15-27	13-22	6.1-6.5	0
	2-24	40-60	29-42	6.6-7.3	0
	24-33	---	---	---	---
Coastwise	0-1	8-27	7.7-22	6.6-7.3	0
	1-4	4-27	4.1-22	5.6-6.0	0
	4-10	27-40	21-30	6.6-7.3	0
	10-19	40-60	29-43	7.4-7.8	0
	>19	---	---	---	---

Table 11.--Chemical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
423:					
Masthead	0-4	5-27	5.0-22	7.5-7.9	0
	4-11	40-60	29-43	7.4-7.8	0
	11-30	40-60	29-42	7.8-8.0	0
	30-31	---	---	---	---
Coastwise	0-1	0-1	65-103	5.0-6.0	0
	1-6	1-12	1.3-11	6.6-7.3	0
	6-15	40-60	29-43	7.4-7.8	0
	15-18	40-60	29-43	7.4-7.8	0
	18-20	---	---	---	---
Dewpoint	0-1	0-1	65-103	5.5-6.5	0
	1-4	0-1	73-134	5.5-6.5	0
	4-7	16-20	14-17	5.8-6.7	0
	7-13	6-10	5.9-9.5	5.8-6.5	0
	13-26	40-60	29-43	7.0-8.0	0
	26-30	27-50	21-36	7.0-8.0	0
	30-39	---	---	---	---
424:					
Masthead	0-10	18-27	15-22	7.5-7.9	0
	10-26	40-60	29-43	7.4-7.8	0
	26-53	40-60	29-42	7.7-8.0	0
	53-79	40-60	29-42	7.7-8.0	0
Dewpoint	0-2	0-1	65-103	5.5-6.5	0
	2-4	0-1	73-134	5.5-6.5	0
	4-9	8-18	7.5-16	5.8-6.7	0
	9-13	8-18	7.5-16	5.8-6.5	0
	13-26	40-60	29-43	7.0-8.0	0
	26-35	27-60	21-42	7.0-8.0	0
	35-45	---	---	---	---
Rock outcrop.					
425:					
Coastwise, cobbly	0-5	5-27	5.0-22	7.5-7.9	0
	5-17	40-60	29-43	7.4-7.8	0
	17-20	---	---	---	---
Masthead, cobbly	0-1	5-27	5.0-22	7.5-7.9	0
	1-6	5-27	5.0-22	7.5-7.9	0
	6-16	40-60	29-43	7.4-7.8	0
	16-30	40-60	29-42	7.7-8.0	0
	30-35	---	---	---	---
427:					
Masthead	0-1	5-27	5.0-22	7.5-7.9	0
	1-6	5-27	5.0-22	7.5-7.9	0
	6-24	40-60	29-43	7.4-7.8	0
	24-31	40-60	29-42	7.7-8.0	0
	31-33	---	---	---	---
Coastwise, cobbly	0-6	1-12	3.1-11	6.6-7.3	0
	6-15	27-40	14-21	6.6-7.3	0
	15-16	---	---	---	---

Table 11.--Chemical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
427:					
Typic Haploxeralfs	0-1	0-2	73-103	5.5-6.5	0
	1-2	6-10	5.9-9.3	5.8-7.0	0
	2-7	7-11	6.6-10	5.8-7.0	0
	7-15	16-20	13-17	6.5-7.3	0
	15-23	20-24	16-20	6.5-7.3	0
	23-39	---	---	---	---
450:					
Urban land.					
Xerorthents, landscaped	0-2	3-9	11-17	5.5-7.0	0
	2-12	23-27	12-18	6.8-7.2	0
	12-59	28-32	14-19	7.0-7.4	0
	59-79	8-12	4.7-8.2	7.0-7.4	0
451:					
Nauti, landscaped	0-7	8-27	7.5-23	6.6-7.3	0
	7-16	27-40	0.4-0.6	5.6-8.0	0
	16-24	40-50	30-38	6.6-7.6	0
	24-30	27-40	22-32	7.4-7.8	0
	30-39	---	---	---	---
Urban land.					
453:					
Typic Argixerolls	0-2	10-14	8.9-13	6.0-6.4	0
	2-11	18-22	15-19	6.2-6.6	0
	11-26	40-49	30-38	6.4-6.8	0
	26-59	50-59	36-43	6.6-7.0	0
Urban land, landscaped.					
454:					
Typic Argixerolls, landscaped	0-1	0-1	54-103	5.0-6.2	0
	1-5	8-27	7.5-23	5.8-6.2	0
	5-16	28-32	22-26	6.0-6.4	0
	16-37	13-17	11-15	6.2-6.6	0
	37-63	19-23	15-19	6.4-6.8	0
Calcic Haploxerolls, landscaped	0-1	0-1	54-103	5.2-5.8	0
	1-3	12-27	10-23	6.6-7.0	0
	3-10	18-28	15-23	6.8-7.2	0
	10-19	18-28	15-23	7.0-7.4	0
	19-26	1-18	0.0-0.0	7.4-7.8	0-5
	26-47	12-27	6.4-9.2	7.6-8.0	0-5
	47-79	2-12	0.8-1.6	7.6-8.0	0-5
Urban land, landscaped.					
456:					
Typic Xerorthents, fill	0-4	0-9	0.0-8.3	6.5-7.4	0
	4-61	0-11	0.0-9.7	6.5-7.4	0
	61-79	0-12	0.0-10	6.5-7.4	0
Typic Xerorthents, steep fill	0-6	6-10	5.1-9.1	6.5-7.4	0
	6-79	8-12	6.6-10	6.5-7.4	0
DAM.					
Dam					

Table 11.--Chemical Properties of the Soils--Continued

Map symbol and component name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate
	In	Pct	meq/100g	pH	Pct
GP.					
Gravel pits					
W.					
Water					

Table 12.--Water Features

(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 component name	Hydro-logic group	Months	Ponding			Flooding	
			Surface water depth	Duration	Frequency	Duration	Frequency
			Ft				
156:							
Tongva	B						
		Jan-Dec	---	---	None	---	None
Freeboard	C						
		Jan-Dec	---	---	None	---	None
Starbright	C						
		Jan-Dec	---	---	None	---	None
157:							
Tongva	B						
		Jan-Dec	---	---	None	---	None
Pachic Argixerolls	C						
		Jan-Dec	---	---	None	---	None
Freeboard	C						
		Jan-Dec	---	---	None	---	None
160:							
Beaches	A						
		January	---	---	None	Brief	Frequent
		February	---	---	None	Brief	Frequent
		March	---	---	None	Brief	Frequent
		April	---	---	None	Brief	Frequent
		May	---	---	None	Brief	Frequent
		June	---	---	None	Brief	Frequent
		July	---	---	None	Brief	Frequent
		August	---	---	None	Brief	Frequent
		September	---	---	None	Brief	Frequent
		October	---	---	None	Brief	Frequent
		November	---	---	None	Brief	Frequent
		December	---	---	None	Brief	Frequent
Abaft	A						
		Jan-Dec	---	---	None	---	None
181:							
Haploxerepts	C						
		Jan-Dec	---	---	None	---	None
Purser	C						
		Jan-Dec	---	---	None	---	None
Rock outcrop.							
182:							
Luff	D						
		Jan-Dec	---	---	None	---	None
Haploxerepts	C						
		Jan-Dec	---	---	None	---	None
Haploxeralfs	C						
		Jan-Dec	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and component name	Hydrologic group	Months	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft				
183:							
Purser	D						
		Jan-Dec	---	---	None	---	None
Luff	D						
		Jan-Dec	---	---	None	---	None
184:							
Dewpoint	C						
		Jan-Dec	---	---	None	---	None
Luff	D						
		Jan-Dec	---	---	None	---	None
185:							
Purser, coastal cliffs	C						
		Jan-Dec	---	---	None	---	None
Rock outcrop, coastal cliffs.							
190:							
Typic Xerofluvents	A						
		January	0.0-0.3	Very brief	Occasional	Brief	Frequent
		February	0.0-0.3	Very brief	Occasional	Brief	Frequent
		March	0.0-0.3	Very brief	Occasional	Brief	Frequent
		April	0.0-0.3	Very brief	Occasional	Brief	Frequent
		May	0.0-0.3	Very brief	Occasional	Brief	Frequent
		June	0.0-0.3	Very brief	Occasional	Brief	Frequent
		July	0.0-0.3	Very brief	Occasional	Brief	Frequent
		August	0.0-0.3	Very brief	Occasional	Brief	Frequent
		September	0.0-0.3	Very brief	Occasional	Brief	Frequent
		October	0.0-0.3	Very brief	Occasional	Brief	Frequent
		November	0.0-0.3	Very brief	Occasional	Brief	Frequent
		December	0.0-0.3	Very brief	Occasional	Brief	Frequent
Riverwash	A						
		January	0.0-0.3	Very brief	Occasional	Brief	Frequent
		February	0.0-0.3	Very brief	Occasional	Brief	Frequent
		March	0.0-0.3	Very brief	Occasional	Brief	Frequent
		April	0.0-0.3	Very brief	Occasional	Brief	Frequent
		May	0.0-0.3	Very brief	Occasional	Brief	Frequent
		June	0.0-0.3	Very brief	Occasional	Brief	Frequent
		July	0.0-0.3	Very brief	Occasional	Brief	Frequent
		August	0.0-0.3	Very brief	Occasional	Brief	Frequent
		September	0.0-0.3	Very brief	Occasional	Brief	Frequent
		October	0.0-0.3	Very brief	Occasional	Brief	Frequent
		November	0.0-0.3	Very brief	Occasional	Brief	Frequent
		December	0.0-0.3	Very brief	Occasional	Brief	Frequent

Table 12.--Water Features--Continued

Map symbol and component name	Hydrologic group	Months	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft				
191:							
Typic Haploxerepts	A						
		January	---	---	None	Very brief	Occasional
		February	---	---	None	Very brief	Occasional
		March	---	---	None	Very brief	Occasional
		April	---	---	None	Very brief	Occasional
		May	---	---	None	Very brief	Occasional
		June	---	---	None	Very brief	Occasional
		July	---	---	None	Very brief	Occasional
		August	---	---	None	Very brief	Occasional
		September	---	---	None	Very brief	Occasional
		October	---	---	None	Very brief	Occasional
		November	---	---	None	Very brief	Occasional
		December	---	---	None	Very brief	Occasional
Typic Xerofluvents	A						
		January	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		February	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		March	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		April	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		May	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		June	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		July	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		August	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		September	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		October	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		November	0.0-0.3	Very brief	Occasional	Very brief	Occasional
		December	0.0-0.3	Very brief	Occasional	Very brief	Occasional
Argixerolls	A						
		January	---	---	None	Very brief	Occasional
		February	---	---	None	Very brief	Occasional
		March	---	---	None	Very brief	Occasional
		April	---	---	None	Very brief	Occasional
		May	---	---	None	Very brief	Occasional
		June	---	---	None	Very brief	Occasional
		July	---	---	None	Very brief	Occasional
		August	---	---	None	Very brief	Occasional
		September	---	---	None	Very brief	Occasional
		October	---	---	None	Very brief	Occasional
		November	---	---	None	Very brief	Occasional
		December	---	---	None	Very brief	Occasional
293:							
Rock outcrop.							
Nauti	D						
		Jan-Dec	---	---	None	---	None
Haploxerepts	D						
		Jan-Dec	---	---	None	---	None
400:							
Oboship	B						
		Jan-Dec	---	---	None	---	None
Nauti	B						
		Jan-Dec	---	---	None	---	None
Bosun	B						
		Jan-Dec	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and component name	Hydro-logic group	Months	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft				
407:							
Nauti	B						
		Jan-Dec	---	---	None	---	None
Flyer	B						
		Jan-Dec	---	---	None	---	None
Marpol	C						
		Jan-Dec	---	---	None	---	None
410:							
Express	B						
		Jan-Dec	---	---	None	---	None
Flyer	B						
		Jan-Dec	---	---	None	---	None
Loadline	C						
		Jan-Dec	---	---	None	---	None
411:							
Flyer	B						
		Jan-Dec	---	---	None	---	None
Loadline	C						
		Jan-Dec	---	---	None	---	None
Nauti	B						
		Jan-Dec	---	---	None	---	None
412:							
Flyer, gullied	B						
		Jan-Dec	---	---	None	---	None
Express, gullied	B						
		Jan-Dec	---	---	None	---	None
Bosun	B						
		Jan-Dec	---	---	None	---	None
420:							
Masthead	D						
		Jan-Dec	---	---	None	---	None
Luff	D						
		Jan-Dec	---	---	None	---	None
421:							
Masthead	D						
		Jan-Dec	---	---	None	---	None
Luff	D						
		Jan-Dec	---	---	None	---	None
422:							
Dewpoint	D						
		Jan-Dec	---	---	None	---	None
Masthead	D						
		Jan-Dec	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and component name	Hydro-logic group	Months	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft				
422:							
Coastwise	D						
		Jan-Dec	---	---	None	---	None
423:							
Masthead	D						
		Jan-Dec	---	---	None	---	None
Coastwise	D						
		Jan-Dec	---	---	None	---	None
Dewpoint	D						
		Jan-Dec	---	---	None	---	None
424:							
Masthead	C						
		Jan-Dec	---	---	None	---	None
Dewpoint	D						
		Jan-Dec	---	---	None	---	None
Rock outcrop.							
425:							
Coastwise, cobbly	D						
		Jan-Dec	---	---	None	---	None
Masthead, cobbly	D						
		Jan-Dec	---	---	None	---	None
427:							
Masthead	D						
		Jan-Dec	---	---	None	---	None
Coastwise, cobbly	D						
		Jan-Dec	---	---	None	---	None
Typic Haploxeralfs	D						
		Jan-Dec	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and component name	Hydro-logic group	Months	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft				
450:							
Xerorthents, landscaped	B						
		January	---	Very brief	Rare	Extremely brief	Rare
		February	---	Very brief	Rare	Extremely brief	Rare
		March	---	Very brief	Rare	Extremely brief	Rare
		April	---	Very brief	Rare	Extremely brief	Rare
		May	---	Very brief	Rare	Extremely brief	Rare
		June	---	Very brief	Rare	Extremely brief	Rare
		July	---	Very brief	Rare	Extremely brief	Rare
		August	---	Very brief	Rare	Extremely brief	Rare
		September	---	Very brief	Rare	Extremely brief	Rare
		October	---	Very brief	Rare	Extremely brief	Rare
		November	---	Very brief	Rare	Extremely brief	Rare
		December	---	Very brief	Rare	Extremely brief	Rare
451:							
Nauti, landscaped	D						
		Jan-Dec	---	---	None	---	None
Urban land	D						
		Jan-Dec	---	---	None	---	None
453:							
Typic Argixerolls	C						
		Jan-Dec	---	---	None	---	None
Urban land, landscaped	D						
		Jan-Dec	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and component name	Hydro-logic group	Months	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft				
454:							
Typic Argixerolls, landscaped	C						
		January	---	Very brief	Rare	Extremely brief	Rare
		February	---	Very brief	Rare	Extremely brief	Rare
		March	---	Very brief	Rare	Extremely brief	Rare
		April	---	Very brief	Rare	Extremely brief	Rare
		May	---	Very brief	Rare	Extremely brief	Rare
		June	---	Very brief	Rare	Extremely brief	Rare
		July	---	Very brief	Rare	Extremely brief	Rare
		August	---	Very brief	Rare	Extremely brief	Rare
		September	---	Very brief	Rare	Extremely brief	Rare
		October	---	Very brief	Rare	Extremely brief	Rare
		November	---	Very brief	Rare	Extremely brief	Rare
		December	---	Very brief	Rare	Extremely brief	Rare
Calcic Haploxerolls, landscaped	B						
		January	---	Very brief	Rare	Extremely brief	Rare
		February	---	Very brief	Rare	Extremely brief	Rare
		March	---	Very brief	Rare	Extremely brief	Rare
		April	---	Very brief	Rare	Extremely brief	Rare
		May	---	Very brief	Rare	Extremely brief	Rare
		June	---	Very brief	Rare	Extremely brief	Rare
		July	---	Very brief	Rare	Extremely brief	Rare
		August	---	Very brief	Rare	Extremely brief	Rare
		September	---	Very brief	Rare	Extremely brief	Rare
		October	---	Very brief	Rare	Extremely brief	Rare
		November	---	Very brief	Rare	Extremely brief	Rare
		December	---	Very brief	Rare	Extremely brief	Rare
Urban land, landscaped	D						
		Jan-Dec	---	---	None	---	None
456:							
Typic Xerorthents, fill	B						
		Jan-Dec	---	---	None	---	None
Typic Xerorthents, steep fill	B						
		Jan-Dec	---	---	None	---	None

Table 12.--Water Features--Continued

Map symbol and component name	Hydro-logic group	Months	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft				
DAM.							
Dam							
GP.							
Gravel pits							
W.							
Water							

Table 13.--Soil Features

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

Map symbol and component name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Soil slippage potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In				
156:						
Tongva	Paralithic bedrock	20-39	Moderately cemented	Low	Moderate	Low
Freeboard	Paralithic bedrock	39-59	Moderately cemented	Medium	High	Low
Starbright	Paralithic bedrock	39-43	Moderately cemented	Medium	High	Low
157:						
Tongva	Paralithic bedrock	20-39	Moderately cemented	Medium	Moderate	Low
Pachic Argixerolls	Paralithic bedrock	20-39	Moderately cemented	Medium	Moderate	Low
Freeboard	Paralithic bedrock	39-59	Moderately cemented	Medium	High	Low
160:						
Beaches	---	---	---	High	Moderate	Moderate
Abaft	---	---	---	High	Low	Low
181:						
Haploxerepts	Paralithic bedrock	20-39	Moderately cemented	Medium	Low	Low
Purser	Lithic bedrock	8-20	Very strongly cemented	Medium	High	Low
Rock outcrop	---	---	---	Medium	---	---
182:						
Luff	Abrupt textural change	4-33	---	High	High	Low
	Lithic bedrock	20-39	Strongly cemented			
Haploxerepts	Paralithic bedrock	39-59	Moderately cemented	Low	Low	Low

Table 13.--Soil Features--Continued

Map symbol and component name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
182:						
Haploxeralfs	---	---	---	Medium	High	High
183:						
Purser	Lithic bedrock	8-20	Very strongly cemented	Medium	High	Low
Luff	Abrupt textural change	4-33	---	High	High	Low
	Lithic bedrock	20-59	Strongly cemented			
184:						
Dewpoint	Lithic bedrock	22-39	Very strongly cemented	High	High	Low
Luff	Abrupt textural change	1-2	---	High	High	Low
	Lithic bedrock	20-39	Strongly cemented			
185:						
Purser, coastal cliffs	Lithic bedrock	8-20	Very strongly cemented	Medium	High	Low
Rock outcrop, coastal cliffs	---	---	---	Medium	---	---
190:						
Typic Xerofluvents	---	---	---	Low	Low	Low
Riverwash	---	---	---	Low	---	---
191:						
Typic Haploxerepts	Strongly contrasting textural stratification	23-65	---	Low	Low	Low
Typic Xerofluvents	---	---	---	Low	Low	Low
Argixerolls	---	---	---	Low	Low	Low
293:						
Rock outcrop	---	---	---	Medium	---	---
Nauti	Paralithic bedrock	22-41	Moderately cemented	Medium	High	Low

Table 13.--Soil Features--Continued

Map symbol and component name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
293:						
Haploxerepts	Paralithic bedrock	12-20	Moderately cemented	Medium	Low	Low
400:						
Oboship	Lithic bedrock	39-79	Strongly cemented	Medium	Low	Low
Nauti	Paralithic bedrock	22-41	Moderately cemented	Medium	High	Low
Bosun	Paralithic bedrock	39-47	Moderately cemented	Medium	Moderate	Low
407:						
Nauti	Paralithic bedrock	24-43	Moderately cemented	Medium	Moderate	Low
Flyer	Paralithic bedrock	20-59	Moderately cemented	Medium	Moderate	High
Marpol	Lithic bedrock	30-59	Very strongly cemented	Medium	High	Low
410:						
Express	Paralithic bedrock	20-39	Moderately cemented	Medium	Low	Low
Flyer	Paralithic bedrock	20-39	Moderately cemented	Medium	Low	Low
Loadline	Paralithic bedrock	16-30	Moderately cemented	Medium	Low	Low
411:						
Flyer	Paralithic bedrock	20-30	Moderately cemented	Medium	Low	Low
Loadline	Paralithic bedrock	12-30	Moderately cemented	Medium	Low	Low
Nauti	Paralithic bedrock	22-41	Moderately cemented	Medium	Moderate	Low

Table 13.--Soil Features--Continued

Map symbol and component name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Soil slippage potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In				
412:						
Flyer, gullied	Paralithic bedrock	20-30	Moderately cemented	Medium	Low	Moderate
Express, gullied	Paralithic bedrock	30-59	Moderately cemented	Medium	Low	Low
Bosun	Paralithic bedrock	30-59	Moderately cemented	Medium	Moderate	Moderate
420:						
Masthead	Paralithic bedrock	20-39	Moderately cemented	Medium	Moderate	Low
Luff	Abrupt textural change	7-9	Noncemented	Medium	High	Low
	Paralithic bedrock	20-39	Moderately cemented			
421:						
Masthead	Paralithic bedrock	20-39	Moderately cemented	Medium	Moderate	Low
Luff	Abrupt textural change	2-6	Noncemented	High	High	Low
	Paralithic bedrock	20-59	Weakly cemented			
422:						
Dewpoint	Paralithic bedrock	20-39	Moderately cemented	Medium	High	Low
Masthead	Paralithic bedrock	20-39	Moderately cemented	Medium	High	Low
Coastwise	Lithic bedrock	10-20	Strongly cemented	Medium	High	Low
423:						
Masthead	Abrupt textural change	2-6	Noncemented	Medium	High	Low
	Paralithic bedrock	20-39	Moderately cemented			
Coastwise	Paralithic bedrock	10-20	Moderately cemented	Medium	High	Low

Table 13.--Soil Features--Continued

Map symbol and component name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Soil slippage potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In				
423:						
Dewpoint	Paralithic bedrock	20-39	Moderately cemented	Medium	High	Low
424:						
Masthead	---	---	---	Medium	High	Low
Dewpoint	Paralithic bedrock	20-39	Moderately cemented	Medium	High	Low
Rock outcrop.						
425:						
Coastwise, cobbly	Abrupt textural change	2-6	Noncemented	Medium	High	Low
	Paralithic bedrock	10-20	Moderately cemented			
Masthead, cobbly	Abrupt textural change	5-8	Noncemented	Medium	High	Low
	Paralithic bedrock	20-39	Moderately cemented			
427:						
Masthead	Abrupt textural change	4-8	Noncemented	Medium	High	Low
	Paralithic bedrock	20-39	Moderately cemented			
Coastwise, cobbly	Lithic bedrock	10-20	Strongly cemented	Medium	High	Low
Typic Haploxeralfs	Paralithic bedrock	20-39	Moderately cemented	Medium	Low	Low
450:						
Urban land.						
Xerorthents, landscaped	---	---	---	Medium	Low	Low
451:						
Nauti, landscaped	Paralithic bedrock	22-41	Moderately cemented	Medium	High	Low
Urban land	---	---	---	Medium	---	---

Table 13.--Soil Features--Continued

Map symbol and component name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
453:						
Typic Argixerolls	---	---	---	Medium	High	Low
Urban land, landscaped	---	---	---	Medium	---	---
454:						
Typic Argixerolls, landscaped	---	---	---	Low	Low	Low
Calcic Haploxerolls, landscaped	---	---	---	Low	Low	Low
Urban land, landscaped	---	---	---	Low	---	---
456:						
Typic Xerorthents, fill	---	---	---	Medium	Low	Low
Typic Xerorthents, steep fill	---	---	---	Medium	Low	Low
DAM.						
Dam						
GP.						
Gravel pits						
W.						
Water						

Table 14.--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
Abaft	Mixed, thermic Typic Xeropsamments
Argixerolls	Argixerolls
Bosun	Loamy-skeletal, mixed, superactive, isothermic Typic Argiustolls
Calcic Haploxerolls	Calcic Haploxerolls
Coastwise	Clayey, smectitic, thermic, shallow Mollic Haploxeralfs
Dewpoint	Fine, smectitic, isothermic Typic Paleustalfs
Express	Coarse-loamy, mixed, active, thermic Typic Haploxerepts
Flyer	Coarse-loamy, mixed, active, thermic Typic Argixerolls
Freeboard	Fine, smectitic, thermic Vertic Haploxeralfs
Haploxeralfs	Haploxeralfs
Haploxerepts	Haploxerepts
Loadline	Loamy, mixed, active, thermic, shallow Typic Argixerolls
Luff	Fine, smectitic, thermic Vertic Palexeralfs
Marpol	Fine, mixed, superactive, thermic Typic Palexerolls
Masthead	Fine, smectitic, thermic Mollic Palexeralfs
Nauti	Fine-loamy, mixed, superactive, thermic Mollic Haploxeralfs
Oboship	Coarse-loamy, mixed, superactive, isothermic Pachic Haplustolls
Pachic Argixerolls	Loamy-skeletal, mixed, thermic Pachic Argixerolls
Purser	Clayey, smectitic, thermic Lithic Haploxeralfs
Starbright	Fine, smectitic, isothermic Typic Argiustolls
*Tongva	Fine-loamy, mixed, superactive, thermic Typic Argixerolls
Typic Argixerolls	Fine-loamy, mixed, thermic Typic Argixerolls
Typic Haploxeralfs	Loamy-skeletal, mixed, thermic Typic Haploxeralfs
Typic Haploxerepts	Loamy-skeletal, mixed, active, thermic Typic Haploxerepts
Typic Xerofluvents	Typic Xerofluvents
Typic Xerorthents	Loamy-skeletal, smectitic, thermic Typic Xerorthents
Xerorthents	Xerorthents

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