



United States
Department of
Agriculture

**Natural Resources
Conservation
Service**

In cooperation with the
Eastern Kern County Resource
Conservation District and the
Regents of the University of
California (Agricultural Experiment
Station)

INTERIM REPORT

Soil Survey of Northeastern Kern Area, California

Ridgecrest Part



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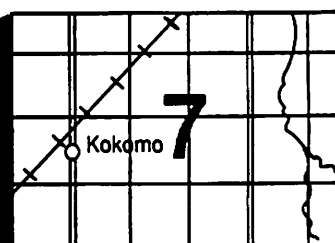
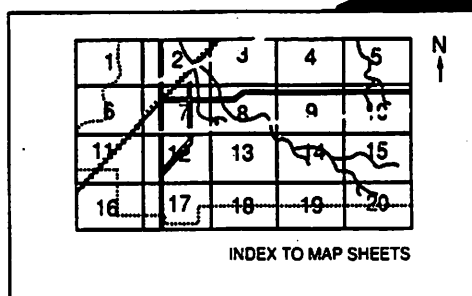
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HOW TO USE THIS SOIL SURVEY

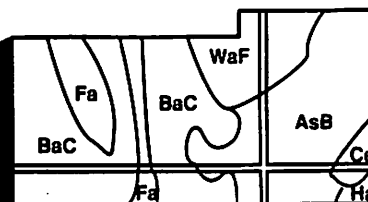
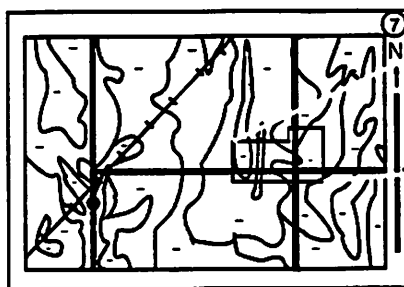
Detailed Soil Maps

The detailed soil maps contained with this report can be useful in planning the use of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, (see Contents). 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 numbers that are in that area. Turn to the **Numerical Index to Map Units** (see Contents), which lists the map units by symbol and shows the name of the unit and the page where each map unit is described.



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

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

This Interim Report for the Ridgecrest Part of the Northeastern Kern Area 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 has leadership for the Federal part of the National Cooperative Soil Survey. All NRCS programs and services are offered on a nondiscriminatory basis, without regard to race, color, national origin, sex, age, religion, marital status or handicap.

This survey was made cooperatively by the Natural Resources Conservation Service, the Eastern Kern Resource Conservation District, the Kern Valley Resource Conservation District, the Regents of the University of California (Agricultural Experiment Station), the State of California - Department of Conservation and the County of Kern

All text and maps in this publication are based on preliminary information and are subject to change. Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping.

March 10, 1995
Natural Resources Conservation Service
(formerly Soil Conservation Service)

Cover Photograph: Creosotebush, the taller shrub, dominates much of the vegetation in the survey area. Koehn Lake, which is usually dry, and part of an irrigated field are in the background.

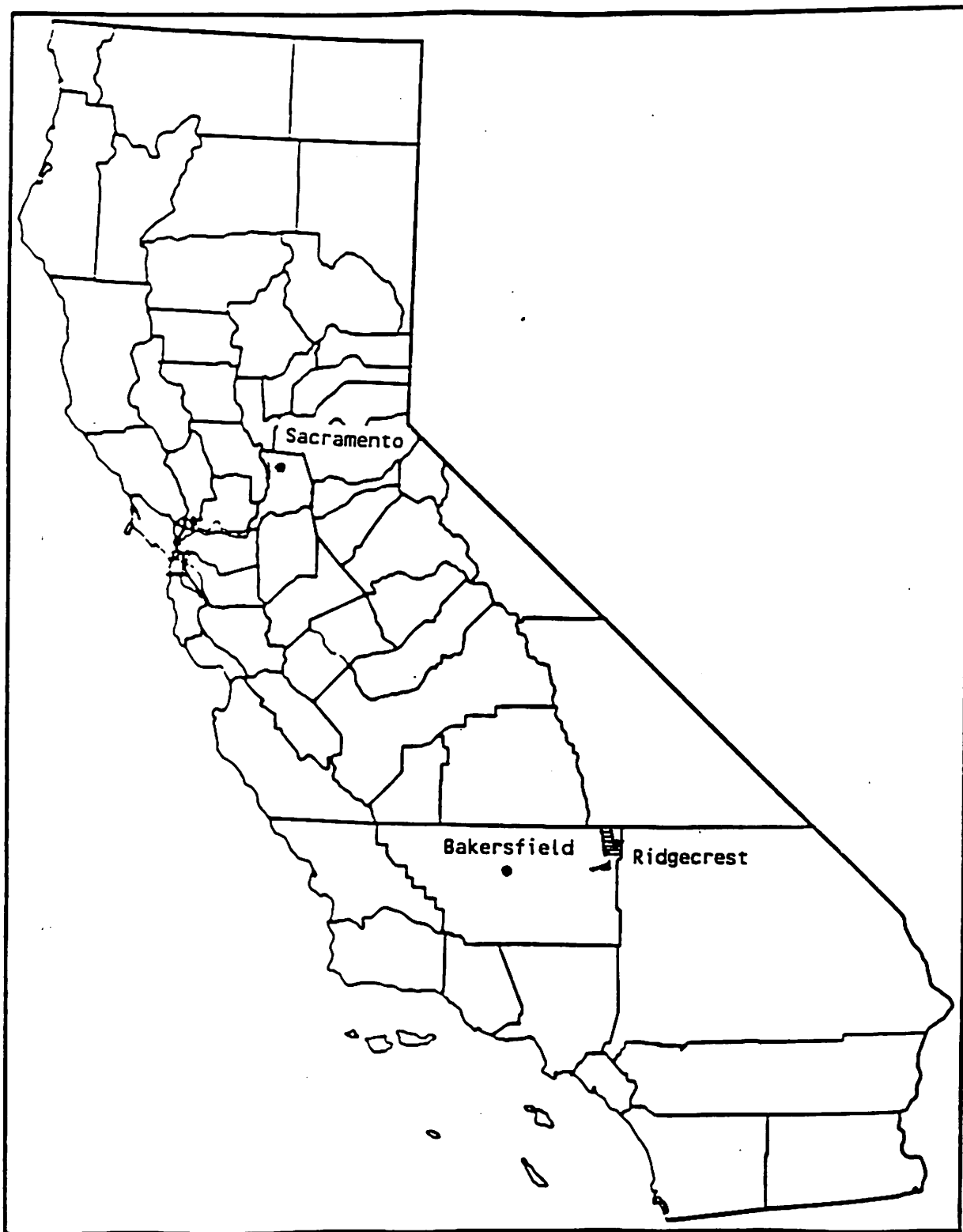


Figure 1. - Location of the Ridgecrest Area in California.

Soil Survey of

Northeastern Kern Area, California

Ridgecrest Part

Interim Report

By
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Fieldwork by
James F. Regal and Maxine Levin

United States Department of Agriculture
Natural Resources Conservation Service
in cooperation with
Regents of the University of California
(Agricultural Experiment Station)
and

Eastern Kern Resource Conservation District

The Ridgecrest Part of the Northeastern Kern Soil Survey Area is located in the northern part of the Mojave Desert. It includes parts of the Indian Wells Valley and a small part of the Fremont Valley. This report covers an area of 70,860 acres. Most of the area was mapped between 1982 and 1985. In 1994, the area was slightly expanded and additional mapping was completed then.

General Nature of the Survey Area

The following sections provide information about the climate, physiography, relief and drainage of the area.

Climate

This section was prepared from information provided by the National Climatic Center, Asheville, North Carolina and from information provided by the Naval Air Weapons Center Meteorological Office.

Most of the Ridgecrest area is within the Indian Wells Valley. The southern part of the survey covers part of Fremont Valley. The valleys have more climate data than the surrounding mountains.

The climate is characterized by hot, dry summers, and cool, slightly moist winters. The average annual air temperature is about 63 degrees F. In January, the average temperature

is about 43 degrees F, and the average daily minimum temperature is about 29 degrees F. The lowest temperature on record is 0 degrees F, which occurred on January 13, 1963. In July, the average temperature is about 86 degrees, and the average daily maximum temperature is about 102 degrees F. The highest recorded temperature is 122 degrees F. On the average, the temperature is above 95 degrees about 90 days a year. The average annual precipitation is about 4 inches. Of this, about 30 percent usually falls in April through September. Most precipitation comes as light rainfall during the winter months but thunderstorms occasionally bring brief but heavy rains in late summer. January, with about 0.67 inches, is the month with the highest average precipitation. Snowfall is rare. In about 49 percent of the winters there is no measurable snowfall. On the average, snowfall occurs about 1 day a year.

The mean relative humidity in January is about 53 percent. Humidity is lower in summer. July, with a mean relative humidity of about 24 percent, is the month with the lowest humidity.

The average hourly windspeed is about 7 mph, and the prevailing wind direction is southwest. A peak gust of over 50 mph has been recorded in every month of the year. Wind gusts exceed 40 miles per hour an average of about 29 days a year.

Additional climate information can be obtained from NWC Technical Memorandum 4158, The Weather at NWC (12).

Physiography, Relief and Drainage

The survey area mainly consists of alluvial fans and alluvial plains that occur in the northern part of the Mojave Desert. Some terraces occur at the base of mountain ranges and adjacent to some stream channels. A few small areas of hills, with bedrock at a shallow depth, are included. The lowest position on the landscape is occupied by playas.

Elevations in the area range from a high of 3,000 feet in the hills to a low of 1,850 feet in the playas. Most rainwater is quickly absorbed by the sandy soils in the area. Some rainfall from the surrounding hills and mountains collects in intermittent stream channels, flows across the terraces, alluvial fans and plains, and settles in the playas. Very brief flooding occurs in some low lying areas as the water collected in intermittent stream channels spreads out over the land surface or collects in low lying areas where it is absorbed into the soil or evaporates.

How This Survey Was Made

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

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

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted 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 vegetation, buildings, fields, roads, and stream channels, all of which help in locating boundaries accurately.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of 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. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a 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 or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas 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 "included" areas that belong to other taxonomic classes.

Most included 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, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. 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 included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas 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 included areas 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, but if intensive use of small areas is planned, 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. Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cajon sandy loam, 0 to 2 percent slopes is a phase of the Cajon series.

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Cerrocoso-Urban land complex 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. Cajon-Helendale association, 5 to 15 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 A gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of 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.

Map Unit Descriptions

221 - Alko loamy coarse sand, 0 to 2 percent slopes

Setting

Landform: alluvial plains and alluvial fans

Elevation: 2,200 to 2,300 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 64 degrees F

Frost-free period: 200 to 225 days

Composition

Alko sandy loam and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Alko Soil

Parent material: granitic alluvium

Typical profile:

0 to 1 inches = pale brown loamy coarse sand

1 to 15 inches = pale brown and light yellowish brown sandy loam

15 to 28 inches = strongly cemented hardpan

28 to 60 inches = pale brown loamy coarse sand

Depth class: shallow

Drainage class: well drained

Permeability: moderately rapid above the hardpan and very slow in the hardpan

Available water capacity: very low

Shrink-swell potential: low

Depth to hardpan: 10 to 20 inches

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare, flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: $K = .15$; $T = 1$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 86$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Lewkalb soils

Cajon soils

Stratified saline-sodic soils

Soils similar to Alko except that they are weakly cemented and have an average texture of loamy sand throughout the profile

Soils with slopes greater than 2 percent

Use and Management

Land use: wildlife habitat, limited rangeland, and homesite development

Rangeland

Common plants: saltbush, white bursage, shadscale and filaree

Major management factors: low precipitation, very low available water capacity and shallow depth to hardpan.

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought, shallow depth and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation and shallow depth.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, shallow depth to cemented pan and hazard of soil blowing

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent

the possibility of septic tank effluent contaminating groundwater.

- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * In order for septic tank absorption fields to function properly, it is usually necessary to rip the cemented pan to improve permeability.

Interpretive Groups

Land capability classification: Vlls, nonirrigated

MLRA: 30

Prime farmland: no

135 - Arizo very cobbly coarse sand, 2 to 9 percent slopes, occasionally flooded

Setting

Landform: alluvial fans

Elevation: 1,900 to 2,700 feet

Slope range: 2 to 9 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 230 days

Composition

Arizo and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Arizo Soil

Position on landscape: alluvial fans

Parent material: granitic alluvium

Important surface feature: surface typically covered with 1 to 5 percent surface stones

Typical profile:

0 to 8 inches = brown very cobbly coarse sand

8 to 60 inches = stratified yellowish brown gravelly loamy sand to light yellowish brown very gravelly coarse sand

Depth class: very deep

Drainage class: excessively drained

Permeability: very rapid

Available water capacity: very low or low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: occasional; flooding is more likely to occur in and along drainageways

Erosion factors: K = .10; T = 5

Hazard of water erosion in bare areas: moderate

Wind erodibility index: I = 86

Hazard of wind erosion in bare areas: moderate

Contrasting inclusions:

Cajon soils

Helendale soils

Riverwash

Use and Management

Land use: borrow pits rangeland and homesite development

Rangeland

Common plants: creosotebush and white bursage

Major management factors: low precipitation and low available water capacity

Management considerations:

- * In some areas of this unit the surface soil and vegetation has been removed during excavations.
- * Re-establishing vegetation and stabilizing the cut banks is a good method to prevent continued sloughing and erosion.
- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: Occasional hazard of flooding, poor filter

Management considerations:

- * Homesites, local roads and streets should be constructed above the expected flood level. Flood control structures can be used to reduce damage from flooding

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: VIIw,
nonirrigated
MLRA: 30
Prime farmland: no

105 - Cajon sand, 0 to 2 percent slopes

Setting

Landform: Alluvial fans and alluvial plains
Elevation: 2,000 to 2,400 feet
Slope range: 0 to 2 percent
Vegetation: mainly desert shrubs forbs and grasses
Mean annual precipitation: 3 to 5 inches
Mean annual temperature: 62 to 65 degrees F
Frost-free period: 200 to 225 days

Composition

Cajon and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Cajon Soil

Parent material: granitic alluvium
Typical profile:
0 to 7 inches = yellowish brown sand
7 to 25 inches = yellowish brown sand
25 to 55 inches = yellowish brown loamy sand
55 to 60 inches = yellowish brown gravelly loamy sand
Depth class: very deep
Drainage class: somewhat excessively drained
Permeability: rapid
Available water capacity: low
Shrink-swell potential: low
Depth to bedrock: more than 60 inches
Surface runoff: very slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: K = .15; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 180

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Helendale soils
Neuralia soils
Stratified saline-sodic soils
Cajon saline-sodic soils
Cerrocoso soils
Playas
Soils with slopes greater than 2 percent

Use and Management

Land use: Irrigated crop production, rangeland, homesite development and wildlife habitat

Irrigated crops

Commonly grown crops: alfalfa hay and grains

Major management factors: low available water capacity and hazard of soil blowing

Management considerations:

- * Returning crop residue and regularly adding organic matter and fertilizer increases fertility, improves soil structure, and increases the available water capacity.
- * Soil blowing can be reduced by returning crop residue to the soil and practicing minimum tillage.
- * Frequent irrigations are needed because of the low available water capacity.
- * Water should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize leaching of plant nutrients.

Rangeland

Common plants: creosotebush, allscale saltbush, filaree and Mediterranean Schismus

Major management factors: low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.

- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * In areas within this unit where a desirable perennial grass occurs, manage the range to insure its survival.

Homesite development

Major management factors: rare hazard of flooding, poor filter and hazard of soil blowing

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: IIIs-4, irrigated, and VIIe, nonirrigated

MLRA: 30

Prime farmland: no

106 - Cajon sand, 2 to 5 percent slopes

Setting

Landform: alluvial fans

Elevation: 2,000 to 2,300 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs, forbs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 230 days

Composition

Cajon and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Cajon Soil

Parent material: granitic alluvium

Typical profile:

0 to 10 inches = yellowish brown sand

10 to 48 inches = light yellowish brown loamy sand

48 to 60 inches = yellowish brown gravelly sand

Depth class: very deep

Drainage class: somewhat excessively drained

Permeability: rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Erosion factors: K = .15; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 180

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Helendale soils

Neuralia soils

Soils stratified with gravelly layers

Use and Management

Land use: Wildlife habitat, irrigated crops, rangeland and homesite development

Irrigated crops

Commonly grown crops: alfalfa hay and grains

Major management factors: low available water capacity and hazard of soil blowing

Management considerations:

- * Returning crop residue and regularly adding organic matter and fertilizer increases fertility, improves soil structure, and increases the available water capacity.
- * Soil blowing can be reduced by returning crop residue to the soil and practicing minimum tillage.
- * Frequent irrigations are needed because of the low available water capacity.
- * Water should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize leaching of plant nutrients.

Rangeland

Common plants: creosotebush, filaree, allscale saltbush and Mediterranean schismus

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * In areas within this unit where a desirable perennial grass occurs, manage the range to insure its survival.

Homesite development

Major management factors: poor filter and hazard of soil blowing

Management considerations:

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: IIIs-4, irrigated and VIIe, nonirrigated

MLRA: 30

Prime farmland: no

104 - Cajon sand, 0 to 5 percent slopes, occasionally flooded

Setting

Landform: channels on alluvial fans and alluvial plains

Elevation: 2,195 to 2,650 feet

Slope range: 0 to 5 percent

Vegetation: mainly desert shrubs and grasses

Mean annual precipitation: 3 to 6 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 240 days

Composition

Cajon and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Cajon Soil

Parent material: granitic alluvium

Typical profile:

0 to 14 inches = light yellowish brown sand

14 to 25 inches = yellowish brown loamy sand

25 to 60 inches = yellowish brown and pale brown stratified gravelly coarse sand to loamy sand

Depth class: very deep

Drainage class: somewhat excessively drained

Permeability: rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: occasional

Erosion factors: K = .15; T = 5

Hazard of water erosion in bare areas: moderate.

Wind erodibility index: I = 180

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Helendale soils

Riverwash

Soils with slopes greater than 5 percent

Use and Management

Land use: Rangeland, wildlife habitat and homesite development

Rangeland

Common plants on the Cajon soil:

creosotebush, burrobrush, allscale saltbush and red brome

Major management factors: low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.

- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * In areas within this unit where a desirable perennial grass occurs, manage the range to insure its survival.

Homesite development

Major management factors: occasional hazard of flooding, poor filter and hazard of soil blowing

Management considerations:

- * Homesites, local roads and streets should be constructed above the expected flood level. Flood control structures can be used to reduce the damage from flooding.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: VIIw, nonirrigated

MLRA: 30

Prime farmland: no

161 - Cajon sand, channeled, 2 to 9 percent slopes, occasionally flooded

Setting

Landform: channeled alluvial plains and alluvial fans

Elevation: 2,200 to 2,600 feet

Slope range: 2 to 9 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 230 days

Composition

Cajon Sand and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Cajon Soil

Parent material: granitic alluvium

Typical profile:

0 to 3 inches = light yellowish brown sand

3 to 7 inches = yellowish brown loamy coarse sand

7 to 60 inches = stratified light yellowish brown gravelly coarse sand to loamy sand

Depth class: very deep

Drainage class: somewhat excessively drained

Permeability: rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: medium

Flooding: occasional

Erosion factors: K = .15; T = 5

Hazard of water erosion in bare areas: moderate

Wind erodibility index: I = 180

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Helendale Soils

Cajon Soils

Gravelly Soils

Soils with soils greater than 9 percent escarpments with slopes to 30 percent Riverwash

Use and Management

Land use: wildlife habitat, rangeland, and homesite development

Rangeland

Common plants: creosotebush and white bursage

Major management factors: low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.

- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: occasional hazard of flooding, poor filter and hazard of soil blowing

Management considerations:

- * Homesites, local roads and streets should be constructed above the expected flood level. Flood control structures can be used to reduce the damage from flooding.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: VIIw, nonirrigated

MLRA: 30

Prime farmland: no

108 - Cajon gravelly sand, 2 to 5 percent slopes

Setting

Landform: alluvial fans and alluvial plains

Elevation: 1,900 to 3,000 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs, forbs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 230 days

Composition

Cajon gravelly sand and similar inclusions:

85 percent

Contrasting inclusions: 15 percent

Characteristics of the Cajon Soil

Parent material: granitic alluvium

Typical profile:

0 to 4 inches = light yellowish brown gravelly sand

4 to 60 inches = pale brown gravelly loamy coarse sand

Depth class: very deep

Drainage class: somewhat excessively drained

Permeability: rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: very slow

Erosion factors: K = .10; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 134

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cerrocoso soils

Helendale soils

Soils with slopes greater than 5 percent

Use and Management

Land use: Irrigated crop production, rangeland, homesite development, and wildlife habitat

Irrigated crops

Commonly grown crops: alfalfa hay and grains

Major management factors: low available water capacity, gravelly textures and hazard of soil blowing

Management considerations:

- * Returning crop residue and regularly adding organic matter and fertilizer increases fertility, improves soil structure, and increases the available water capacity.
- * Soil blowing can be reduced by returning crop residues to the soil and practicing minimum tillage.
- * Because of the slope, sprinkler or drip irrigation is most suitable for row crops.
- * Frequent irrigations are needed because of the low available water capacity.
- * Water should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize leaching of plant nutrients.

Rangeland

Common plants: creosotebush,
Mediterranean schismus, filaree and
allscale saltbush

Major management factors: low precipitation
and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * Promote uniform grazing by properly distributing watering facilities

Homesite development

Major management factors: poor filter and hazard of soil blowing

Management considerations:

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: IVs-4, irrigated
and VIIe, nonirrigated

MLRA: 30

Prime farmland: no

102 - Cajon gravelly loamy sand, 0 to 2 percent slopes

Setting

Landform: alluvial fans and alluvial plains

Elevation: 1,900 to 2,400 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Cajon and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Cajon Soil

Parent material: granitic alluvium

Typical profile:

0 to 6 inches = light yellowish brown gravelly loamy sand

6 to 60 inches = pale brown gravelly loamy coarse sand

Depth class: very deep

Drainage class: somewhat excessively drained

Permeability: rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: very slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: K = .10; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 86

Hazard of wind erosion in bare areas:
moderate

Contrasting inclusions:

Alko Soils

Helendale Soils

narrow channels that flood following rainstorms

Soils with slopes greater than 2 percent

Use and Management

Land use: Irrigated crop production, rangeland, homesite development, and wildlife habitat

Irrigated crops

Commonly grown crops: alfalfa hay and grains

Major management factors: low available water capacity and hazard of soil blowing

Management considerations:

- * Returning crop residue and regularly adding organic matter and fertilizer

increases fertility, improves soil structure, and increases the available water capacity.

- * Soil blowing can be reduced by returning crop residues to the soil and practicing minimum tillage.
- * Furrow, boarder, sprinkler, and drip irrigation is suited to this unit.
- * Frequent irrigations are needed because of the low available water capacity.
- * Water should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize the leaching of plant nutrients.

Rangeland

Common plants on the Cajon soil:

creosotebush, Mediterranean schismus, white bursage and allscale saltbush

Major management factors: Low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * Promote uniform grazing by properly distributing watering facilities

Homesite development

Major management factors: rare hazard of flooding, poor filter

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: IVs-4, irrigated and VIIe, nonirrigated

MLRA: 30

Prime farmland: no

109 - Cajon sandy loam, 0 to 2 percent slopes, occasionally flooded.

Setting

Landform: channels on alluvial fans and alluvial plains

Elevation: 1,900 to 2,700 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 61 to 65 degrees F

Frost-free period: 200 to 230 days

Composition

Cajon Sandy Loam and similar inclusions: 90 percent

Contrasting inclusions: 10 percent

Characteristics of the Cajon Soil

Parent material: granitic alluvium

Typical profile:

0 to 2 inches = brown sandy loam

2 to 30 inches = pale brown loamy sand

30 to 60 inches = stratified pale brown gravelly coarse sand to loamy sand

Depth class: very deep

Drainage class: somewhat excessively drained

Permeability: moderately rapid in the surface layer and rapid below the surface

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: medium

Flooding: occasional

Erosion factors: K = .24; T = 5

Hazard of water erosion in bare areas: moderate

Wind erodibility index: I = 86

Hazard of wind erosion in bare areas: moderate

Contrasting inclusions:

Helendale soils

Riverwash

Soils with slopes greater than 2 percent

Other contrasting inclusions near Koehn

Lake:

Rosamond soils
Stratified saline-sodic soils

Use and Management

Land use: Rangeland, wildlife habitat and homesite developmen, few areas are irrigated

Rangeland

Common plants: creosotebush, allscale saltbush, white bursage and filaree

Major management factors: low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * In areas within this unit where a desirable perennial grass occurs, manage the range to insure its survival.

Homesite development

Major management factors: poor filter, occasional hazard of flooding

Management considerations:

- * Homesites, local roads and streets should be constructed above the expected flood level. Flood control structures can be used to reduce the damage from flooding.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: VIIw, nonirrigated

MLRA: 30

Prime farmland: no

162 -Cajon-Helendale complex, 2 to 15 percent slopes

Setting

Landform: alluvial fans and terraces

Description of area: The components are too intricately intermingled to separate at the scale mapped

Elevation: 1,900 to 2,100 feet

Slope range: 2 to 15 percent

Vegetation: mainly desert shrubs, forbs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 230 days

Composition

Cajon soil and similar inclusions: 50 percent

Helendale and similar inclusions: 30 percent

Contrasting inclusions: 20 percent

Characteristics of the Cajon Soil

Position on landscape: alluvial fans and terraces

Slope: 5 to 15 percent

Parent material: mainly granitic alluvium

Typical profile:

0 to 10 inches = yellowish brown loamy sand

10 to 55 inches = light yellowish brown loamy sand

55 to 60 inches = light yellowish brown gravelly loamy sand

Depth class: very deep

Drainage class: somewhat excessively

Permeability: rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Erosion factors: K = .15; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 134

Hazard of wind erosion in bare areas: severe

Characteristics of the Helendale Soil

Position on landscape: alluvial fans and terraces

Slope: 2 to 5 percent

Parent material: mainly granitic alluvium

Typical profile:

0 to 6 inches = yellowish brown gravelly loamy sand

6 to 26 inches = yellowish brown sandy loam

26 to 60 inches = light yellowish brown gravelly coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: moderate

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Erosion factors: K = .15; T = 3

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 86

Hazard of wind erosion in bare areas: moderate

Contrasting inclusions:

Escarments with slopes to 40 percent

Neuralia soils

Soils similar to Cajon except they have a surface layer that is sand or sandy loam

Use and Management

Land use: wildlife habitat and rangeland
Rangeland

Common plants on the Cajon and Helendale

soils: creosotebush, filaree, white bursage and Indian ricegrass

Major management factors: Low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Interpretive Groups

Land capability classification: Cajon and Helendale soils VIIe, nonirrigated

MLRA: 30

Prime farmland: no

291 - Cajon-Urban land complex, 0 to 5 percent slopes

Setting

Landform: alluvial plains and terraces

Description of area: The components are too intricately intermingled to separate at the scale mapped

Elevation: 2,200 to 2,300 feet

Slope range: 0 to 5 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Cajon soil and similar inclusions: 60 percent

Urban Land and similar inclusions: 25 percent

Contrasting inclusions: 15 percent

Characteristics of the Cajon Soil

Position on landscape: alluvial plains and terraces

Slope: 0 to 5 percent

Parent material: mainly granitic alluvium

Typical profile:

0 to 10 inches = yellowish brown loamy sand

10 to 51 inches = light yellowish brown loamy sand

51 to 56 inches = light yellowish brown gravelly loamy sand

56 to 60 inches = light yellowish brown and pale brown stratified sand to loamy fine sand

Depth class: very deep

Drainage class: somewhat excessively drained

Permeability: rapid

Available water capacity: low or moderate

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare, flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: K = .15; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 134

Hazard of wind erosion in bare areas: severe

Characteristics of the Urban Land

Slope: 0 to 5 percent

Description: areas covered by impervious surfaces including buildings, roads, parking lots, sidewalks etc.

Surface runoff: rapid

Contrasting inclusions:

Alko soils

Neuralia soils

Soils similar to Cajon except they have a surface layer that is sand or sandy loam

Use and Management

Land use: homesite development

Homesite development

Major management factors: rare hazard of flooding, poor filter and hazard of soil blowing.

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: Cajon soil VIIe, nonirrigated; Urban land VIII

MLRA: 30

Prime farmland: no

180 - Cerrocoso gravelly sandy loam, 0 to 2 percent slopes

Setting

Landform: alluvial fans and fan terraces

Elevation: 2,100 to 2,800 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F
Frost-free period: 200 to 225 days

Composition

Cerrocoso gravelly sandy loam and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Cerrocoso Soil

Parent material: granitic alluvium

Typical profile:

0 to 3 inches = brown gravelly sandy loam

3 to 21 inches = reddish brown and brown, sandy clay loam and sandy clay

21 to 27 inches = weakly cemented light brown coarse sandy loam

27 to 60 inches = weakly cemented stratified pinkish white very gravelly coarse sand and light brown coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Sodicity (SAR): 1 to 10 from 0 to 3 inches, 10 to 20 from 3 to 21 inches, 5 to 20 from 21 to 27, 1 to 15 from 27 to 60 inches

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches, depth somewhat restricted by a weakly cemented layer

Surface runoff: slow

Flooding: rare, flooding is more likely to occur in and along drainage channels and in depressions.

Erosion factors: $K = .15$; $T = 4$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 86$

Hazard of wind erosion in bare areas: moderate

Contrasting inclusions:

Cajon soils

Garlock soils

Neuralia soils

Soils similar to Cerrocoso except that they have a strongly cemented layer in or below the subsoil.

Soils with slopes greater than 2 percent.

Use and Management

Land use: wildlife habitat, rangeland, and homesite development

Rangeland

Common plants: creosotebush, filaree, and white bursage

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, percolates slowly, weak cementation, shrink-swell, sodicity

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted salt and drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: VIIe, nonirrigated

MLRA: 30

Prime farmland: no

181 - Cerrocoso gravelly sandy loam, 2 to 5 percent slopes

Setting

Landform: alluvial fans and fan terraces

Elevation: 2,100 to 2,300 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs, and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 225 days

Composition

Cerrocoso gravelly sand and similar

inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Cerrocoso Soil

Parent material: granitic alluvium

Typical profile:

0 to 3 inches = brown gravelly sandy loam

3 to 21 inches = reddish brown and brown, sandy clay loam and sandy clay

21 to 27 inches = weakly cemented light brown coarse sandy loam

27 to 60 inches = stratified light brown coarse sand and pinkish white very gravelly coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Sodicity (SAR): 1 to 10 from 0 to 3 inches, 10 to 20 from 3 to 21 inches, 5 to 20 from 21 to 27, 1 to 15 from 27 to 60 inches

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches, depth somewhat restricted by the weakly cemented layer

Surface runoff: slow

Erosion factors: $K = .15$; $T = 4$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 86$

Hazard of wind erosion in bare areas: moderate

Contrasting inclusions:

Cajon soils in drainage ways

Helendale soils

Soils similar to Cerrocoso except that they are not cemented and stratified saline-sodic soils

Use and Management

Land use: wildlife habitat, rangeland, and homesite development

Rangeland

Common plants: creosotebush, filaree, and white bursage

Major management factors: low precipitation
Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, weak cementation, hazard of soil blowing, shrink-swell, percolates slowly and sodicity

Management considerations:

- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Vlle,
nonirrigated

MLRA: 30

Prime farmland: no

182 - Cerrocoso-Urban land complex, 0 to 5 percent slopes

Setting

Landform: alluvial fans and fan terraces

Description of area: These soils are too intricately intermingled to separate at the scale mapped.

Elevation: 2,100 to 2,500 feet

Slope range: 0 to 5 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F
Frost-free period: 200 to 225 days

Composition

Cerrocoso gravelly sandy loam and similar inclusions: 50 percent

Urban land and similar inclusions: 40 percent

Contrasting inclusions: 10 percent

Characteristics of the Cerrocoso Soil

Position on landscape: alluvial fans and fan terraces

Slope: 0 to 5 percent

Parent material: granitic alluvium

Typical profile:

0 to 12 inches = brown loamy sand

12 to 29 inches = strong brown sandy clay loam

29 to 32 inches = brown weakly cemented sandy clay loam

32 to 36 inches = light brown weakly cemented coarse sandy loam

36 to 60 inches = stratified light yellowish brown very gravelly coarse sand to brown loamy coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Sodicity (SAR): 1 to 10 from 0 to 12 inches,
10 to 20 from 12 to 32 inches, 5 to 20
from 32 to 36, 1 to 15 from 36 to 60
inches

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches,
depth can be somewhat restricted by a
weakly cemented layer

Surface runoff: slow

Flooding: rare, flooding is more likely to
occur in and along drainage channels

Erosion factors: K = .15; T = 4

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 134

Hazard of wind erosion in bare areas: severe

Characteristics of the Urban land

Slope: 0 to 5 percent

Description: areas covered by impervious
surfaces including buildings, roads,
parking lots, sidewalks etc.

Surface runoff: rapid

Contrasting inclusions:

Cajon soils

Helendale soils
Neuralia soils
Soils with slopes greater than 5 percent

Use and Management

Land use: urban and homesite development

Homesite development

Major management factors: rare hazard of flooding, weak cementation, hazard of soil blowing, shrink-swell, percolates slowly and sodicity

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted salt and drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Cerrocoso soil
Vile, nonirrigated; Urban land VIII

MLRA: 30

Prime farmland: no

121 - Garlock coarse sand, 0 to 2 percent slopes

Setting

Landform: alluvial fans and stream terraces

Elevation: 2,100 to 2,700 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 225 days

Composition

Garlock coarse sand and similar inclusions:
85 percent

Contrasting inclusions: 15 percent

Characteristics of the Garlock coarse sand Soil

Position on landscape: alluvial fans and stream terraces

Parent material: granitic alluvium

Typical profile:

0 to 4 inches = brown coarse sand

4 to 13 inches = light yellowish brown sandy loam

13 to 39 inches = yellowish brown sandy clay loam

39 to 60 inches = yellowish brown gravelly coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: $K = .10$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 134$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Cerrocoso soils

Helendale soils

Neuralia soils

Use and Management

Land use: wildlife habitat, rangeland and homesite development

Rangeland

Common plants: white bursage, allscale saltbush and creosotebush

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.

- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, percolates slowly in the sandy clay loam layer, hazard of soil blowing, poor filter in the lowest layer, and shrink-swell

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Vlle, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

122 - Garlock coarse sand, 2 to 5 percent slopes

Setting

Landform: alluvial fans and stream terraces

Elevation: 2,100 to 3,000 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 225 days

Composition

Garlock coarse sand and similar inclusions:

85 percent

Contrasting inclusions: 15 percent

Characteristics of the Garlock coarse sand Soil

Position on landscape: alluvial fans and stream terraces

Parent material: granitic alluvium

Typical profile:

0 to 4 inches = brown coarse sand

4 to 13 inches = light yellowish brown sandy loam

13 to 39 inches = yellowish brown sandy clay loam

39 to 60 inches = yellowish brown gravelly coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: slow

Erosion factors: K = .10; T = 3

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 134

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Cerrocoso soils

Neuralia soils

Use and Management

Land use: wildlife habitat, rangeland and homesite development

Rangeland

Common plants: white bursage, allscale saltbush and creosotebush

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.

- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: hazard of soil blowing, percolates slowly in the sandy clay loam layer, poor filter in the lowest layer, and shrink-swell

Management considerations:

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Vlle, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

159 - Garlock complex, 2 to 5 percent slopes

Setting

Landform: alluvial fans and terraces

Description of area: The soils are too intricately intermingled to separate at the scale mapped.

Elevation: 2,500 to 2,900 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Garlock and similar inclusions: 50 percent

Garlock hard substratum and similar inclusions: 35 percent

Contrasting inclusions: 15 percent

Characteristics of the Garlock Soil

Slope: 2 to 5 percent

Parent material: granitic alluvium

Typical profile:

0 to 10 inches = pale brown coarse sand

10 to 26 inches = brown sandy loam

26 to 33 inches = strong brown sandy clay loam

33 to 60 inches = yellowish brown gravelly coarse sand and gravelly loamy coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and depressions

Erosion factors: K = .10; T = 3

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 134

Hazard of wind erosion in bare areas: severe

Characteristics of the Garlock hard substratum Soil

Slope: 2 to 5 percent

Parent material: granitic alluvium

Typical profile:

0 to 8 inches = yellowish brown coarse sand

8 to 29 inches = yellowish brown sandy loam and sandy clay loam

29 to 36 inches = strong brown gravelly sandy clay loam

36 to 50 inches = brownish yellow gravelly loamy coarse sand

50 to 60 inches = brittle cemented layer

Depth class: very deep to rock, somewhat reduced by the brittle cemented layer

Drainage class: well drained

Permeability: moderately slow above the cemented layer

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to hardpan: 40 to 60 inches

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and depressions

Erosion factors: $K = .10$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 134$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Alko soils

Cerrocoso soils

Stratified saline-sodic soils

Use and Management

Land use: homesite development, rangeland and wildlife habitat

Rangeland

Common plants on the Garlock soil:

Creosotebush, white bursage and allscale saltbush

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding; hazard of soil blowing; percolates slowly in the sandy clay loam, gravelly sandy clay loam, and brittle cemented layers; poor filter in the lowest layers and shrink-swell

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater in the Garlock gravelly substratum soil.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing.

Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Vlle, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

116 - Helendale sand, 0 to 2 percent slopes

Setting

Landform: alluvial fans and alluvial plains

Elevation: 2,000 to 2,400 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 225 days

Composition

Helendale and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Helendale Soil

Position on landscape: alluvial fans and alluvial plains

Typical profile:

0 to 12 inches = brown and light yellowish brown sand

12 to 43 inches = reddish yellow sandy loam

43 to 48 inches = reddish yellow loamy coarse sand

48 to 60 inches = reddish yellow gravelly loamy coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare

Erosion factors: K=.10; T=3

Hazard of water erosion in bare areas: slight

Wind erodibility index: I=180

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Neuralia soils

Soils that are similar to Helendale except that their subsoil has texture of loamy sand

Soils that are stratified with textures ranging from gravelly coarse sand to loam

Soils with slopes greater than 2 percent

Use and Management

Land use: Wildlife habitat, irrigated crop production, rangeland and homesite development

Irrigated crops

Commonly grown crops: alfalfa hay and grains

Major management factors: low available water capacity, hazard of soil blowing

Management considerations:

- * Returning crop residue or regularly adding organic matter and fertilizer increases fertility, improves soil structure, and increases the available water capacity.
- * Soil blowing can be reduced by returning crop residue to the soil and practicing minimum tillage.
- * Drip or sprinkler irrigation is suited to this soil.
- * Irrigation water needs to be applied at a rate that insures optimum production without increasing deep percolation, runoff, and erosion.

Rangeland

Common plants on the Helendale soil: creosotebush, white bursage and Indian ricegrass

Major management factors: low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.

- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * Indian Ricegrass may be sparse and contribute little forage production but abundant annual forage is produced when precipitation is favorable.

Homesite development

Major management factors: rare hazard of flooding, poor filter in the lowest layers, and hazard of soil blowing

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: IIIs-0 irrigated, and VIIe, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

117 - Helendale Sand, 2 to 5 percent slopes.

Setting

Landform: alluvial fans and alluvial plains

Elevation: 2,000 to 2,900 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Helendale Sand and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Helendale Soil

Parent material: granitic alluvium

Typical profile:

0 to 12 inches = brown and light yellowish brown sand

12 to 43 inches = reddish yellow sandy loam

43 to 48 inches = reddish yellow loamy coarse sand

48 to 60 inches = reddish yellow gravelly loamy coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Erosion factors: $K = .10$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 180$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Neuralia soils

Soils that are stratified with textures ranging from gravelly coarse sand to loam

Soils with slopes less than 2 percent and greater than 5 percent.

Use and Management

Land use: Wildlife habitat, irrigated crop production, rangeland and homesite development

Irrigated crops

Commonly grown crops: alfalfa hay and grains

Major management factors: low available water capacity, hazard of soil blowing

Management considerations:

- * Returning crop residue or regularly adding organic matter and fertilizer increases fertility, improves soil structure, and increases the available water capacity.
- * Soil blowing can be reduced by returning crop residue to the soil and practicing minimum tillage.

- * Drip or sprinkler irrigation is suited to this soil because of the slope.
- * Irrigation water needs to be applied at a rate that insures optimum production without increasing deep percolation, runoff, and erosion.

Rangeland

Common plants: creosotebush, white bursage and Indian Ricegrass.

Major management factors: low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- * Indian Ricegrass may be sparse and contribute little forage production, but abundant annual forage is produced when precipitation is favorable.

Homesite development

Major management factors: poor filter in the lowest layers, and hazard of soil blowing

Management considerations:

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: IIIs-0, irrigated, and VIIe, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

155 - Helendale loamy sand, 0 to 2 percent slopes

Setting

Landform: alluvial fans and alluvial plains

Elevation: 2,200 to 2,800 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs and grasses

Mean annual precipitation

ion: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 225 days

Composition

Helendale loamy sand and similar inclusions:

85 percent

Contrasting inclusions: 15 percent

Characteristics of the Helendale Soil

Position on landscape: alluvial fans and alluvial plains

Parent material: granitic alluvium

Typical profile:

0 to 4 inches = pale brown loamy sand

4 to 20 inches = yellowish brown and brown sandy loam

20 to 27 inches = yellowish brown brittle sandy loam

27 to 60 inches = yellowish brown gravelly coarse sand

Depth class: very deep, root development might be slightly reduced in the brittle layer

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: $K = .20$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 134$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Cerrocoso soils

Soils similar to Helendale except that they have a thin cemented layer

soils with slopes greater than 2 percent

Use and Management

Land use: wildlife habitat, irrigated crop production, rangeland, homesite development

Irrigated crops

Commonly grown crops: alfalfa hay and grains

Major management factors: low available water capacity and hazard of soil blowing

Management considerations:

- * Returning crop residue or regularly adding organic matter and fertilizer increases fertility, improves soil structure, and increases available water capacity.
- * Soil blowing can be reduced by returning crop residue to the soil and by practicing minimum tillage.
- * Drip or sprinkler irrigation is suited to this soil.
- * Irrigation water needs to be applied at a rate that insures optimum production without increasing deep percolation, runoff, and erosion.
- * Some areas may benefit from deep plowing.

Rangeland

Common plants: white bursage, creosotebush and Indian ricegrass

Major management factors: low precipitation, low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, hazard of soil blowing and poor filter in the lowest layer

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: IIIs-0, irrigated, and VIle, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

156 - Helendale loamy sand, 2 to 5 percent slopes

Setting

Landform: alluvial fans and terraces

Elevation: 2,200 to 2,900 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 225 days

Composition

Helendale loamy sand and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Helendale Soil

Position on landscape: alluvial fans and terraces

Parent material: granitic alluvium

Typical profile:

0 to 4 inches = pale brown loamy sand

4 to 20 inches = yellowish brown and brown sandy loam

20 to 27 inches = yellowish brown brittle sandy loam

27 to 60 inches = yellowish brown gravelly coarse sand

Depth class: very deep, root development might be slightly reduced in the brittle layer

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Erosion factors: K = .20; T = 3

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 134

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Cerrocoso soils

Soils similar to Helendale except that they have a thin cemented layer

soils with slopes greater than 2 and more than 5 percent

Use and Management

Land use: wildlife habitat, rangeland, homesite development

Rangeland

Common plants: white bursage, creosotebush and Indian Ricegrass

Major management factors: low precipitation and low available water capacity

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: hazard of soil blowing and poor filter in the lowest layer

Management considerations:

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.

- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: VIIe, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

118 - Helendale-Urban land complex, 0 to 2 percent slopes

Setting

Landform: alluvial fans and alluvial plains

Description of area: The soils are too intricately intermingled to separate at the scale mapped.

Elevation: 2,200 to 2,600 feet

Slope range: 0 to 2 percent

Vegetation: desert shrubs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 225 days

Composition

Helendale soils and similar inclusions: 45 percent

Urban land and similar inclusions: 40 percent

Contrasting inclusions: 15 percent

Characteristics of the Helendale Soil

Slope: 0 to 2 percent

Parent material: granitic alluvium

Typical profile:

0 to 12 inches = brown and light yellowish brown sand

12 to 43 inches = reddish yellow sandy loam

43 to 48 inches = reddish yellow loamy coarse sand

48 to 60 inches = reddish yellow gravelly loamy coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: low

Shrink-swell potential: low

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: K = .10; T = 3

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 180

Hazard of wind erosion in bare areas: severe

Characteristics of the Urban land

Slope: 0 to 2 percent

Description: areas covered by impervious surfaces including buildings, roads, parking lots, sidewalks etc.

Surface runoff: rapid

Contrasting inclusions:

Cajon soils

Cerrocoso soils

Neuralia soils

Soils similar to Neuralia except they are weakly cemented

Use and Management

Land use: Homesite development and wildlife habitat

Homesite development

Major management factors: rare hazard of flooding, poor filter in the lowest layers and hazard of soil blowing

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.

Interpretive Groups

Land capability classification: Helendale soil VIIe, nonirrigated; Urban land VIII

MLRA: 30

Prime farmland: no

130 - Lavic sand, 0 to 2 percent slopes

Setting

Landform: alluvial plains and basin rims
Elevation: 2,100 to 2,300 feet
Slope range: 0 to 2 percent
Vegetation: mainly desert shrubs
Mean annual precipitation: 3 to 5 inches
Mean annual temperature: 61 to 65 degrees F
Frost-free period: 200 to 240 days

Composition

Lavic sand and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Lavic Soil

Position on landscape: alluvial plains and basin rims
Parent material: granitic alluvium
Typical profile:
0 to 5 inches = yellowish brown sand
5 to 13 inches = yellowish brown loamy sand
13 to 32 inches = light gray and light brownish gray sandy loam
32 to 60 inches = stratified weakly cemented and noncemented light brownish gray loamy coarse sand, sandy loam and loamy sand
Depth class: very deep
Drainage class: moderately well drained
Permeability: moderate
Available water capacity: moderate
Shrink-swell potential: low
Sodicity (SAR): 1 to 5 from 0 to 5 inches, 2 to 12 from 5 to 32 inches, and 8 to 25 from 32 to 60 inches
Salinity: 0 to 4 mmhos/cm
Depth to bedrock: more than 60 inches, rooting depth might be restricted somewhat by a weakly cemented layer.
Surface runoff: slow
Flooding: Rare; flooding is more likely to occur in and along drainage channels and in depressions.
Erosion factors: $K = .10$; $T = 5$
Hazard of water erosion in bare areas: slight
Wind erodibility index: $I = 180$
Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils
Helendale soils

Soils similar to Lavic except that they have a strongly cemented layer between depths of 30 to 50 inches

Soils with slopes greater than 2 percent.

Use and Management

Land use: wildlife habitat, rangeland, homesite development

Rangeland

Common plants: creosotebush, allscale saltbush and white bursage

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, hazard of soil blowing and percolates slowly in the weakly cemented layer

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * In order for septic tank absorption fields to function properly, it usually helpful to rip the weakly cemented layer.

Interpretive Groups

Land capability classification: VIIe,

nonirrigated

MLRA: 30

Prime farmland: no

131 - Lavic-Urban land complex, 0 to 5 percent slopes

Setting

Landform: alluvial plains and basin rims

Description of area: The soils are too intricately intermingled to separate at the scale mapped.

Elevation: 2,100 to 2,400 feet

Slope range: 0 to 5 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 230 days

Composition

Lavic and similar inclusions: 50 percent

Urban land and similar inclusions: 35 percent

Contrasting inclusions: 15 percent

Characteristics of the Lavic Soil

Slope: 0 to 5 percent

Parent material: granitic alluvium

Typical profile:

0 to 5 inches = yellowish brown sand

5 to 13 inches = yellowish brown loamy sand

13 to 32 inches = light gray and light brownish gray sandy loam

32 to 60 inches = stratified weakly cemented and noncemented light brownish gray loamy coarse sand, sandy loam and loamy sand

Depth class: very deep

Drainage class: moderately well drained

Permeability: moderate

Available water capacity: moderate

Shrink-swell potential: low

Sodicity (SAR): 1 to 5 from 0 to 5 inches, 2 to 12 from 5 to 32 inches, and 8 to 25 from 32 to 60 inches

Salinity: 0 to 4 mmhos/cm

Depth to bedrock: more than 60 inches.

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and in depressions.

Erosion factors: K = .10; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 180

Hazard of wind erosion in bare areas: severe

Characteristics of the Urban land

Slope: 0 to 5 percent

Description: areas covered by impervious surfaces including buildings, roads, parking lots, sidewalks etc.

Surface runoff: rapid

Contrasting inclusions:

Cajon soils

Alko soils

Soils that are stratified with textures ranging from sandy loam to clay loam

Soils with slopes greater than 5 percent

Use and Management

Land use: homesite development and wildlife habitat

Homesite development

Major management factors: rare hazard of flooding, hazard of soil blowing and percolates slowly in the weakly cemented layer.

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * In order for septic tank absorption fields to function properly, it is usually helpful to rip the weakly cemented layer.

Interpretive Groups

Land capability classification: Lavic soil VIIe, nonirrigated; Urban land VIII

MLRA: 30

Prime farmland: no

211 - Lewkalb sand, 0 to 2 percent slopes

Setting

Landform: alluvial plains and terraces
Elevation: 2,100 to 2,300 feet
Slope range: 0 to 2 percent
Vegetation: mainly desert shrubs
Mean annual precipitation: 3 to 5 inches
Mean annual temperature: 62 to 66 degrees F
Frost-free period: 200 to 230 days

Composition

Lewkalb and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Lewkalb Soil

Parent material: granitic alluvium
Typical profile:
0 to 12 inches = pale brown sand
12 to 28 inches = pale brown loamy sand
28 to 49 inches = stratified pale yellow sandy loam to light brownish gray loam
49 to 60 inches = cemented hardpan
Depth class: deep
Drainage class: moderately well drained
Permeability: moderate above the hardpan and slow or very slow in the hardpan
Available water capacity: low
Shrink-swell potential: low
Sodicity (SAR): 2 to 15 from 0 to 28 inches, 15 to 50 from 28 to 60 inches
Salinity: 0 to 4 mmhos/cm from 0 to 60 inches
Depth to hardpan: 40 to 60 inches
Depth to bedrock: more than 60 inches
Surface runoff: slow
Flooding: rare, flooding is more likely to occur in drainage channels and in depressions.
Erosion factors: $K = .15$; $T = 3$
Hazard of water erosion in bare areas: slight
Wind erodibility index: $I = 180$
Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Alko soils
Cajon soils
Soils similar to Lewkalb with a hardpan at a depth of 20 to 40 inches
Playas
Soils with slopes greater than 2 percent

Use and Management

Land use: wildlife habitat, rangeland, and homesite development

Rangeland

Common plants: allscale saltbush and shadscale

Major management factors: low precipitation, excess sodium salts

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate excess sodium salts, drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation and excess sodium salts.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, depth to hardpan, sodicity and hazard of soil blowing

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted salt and drought tolerant plants are best suited.
- * In order for septic tank absorption fields to function properly, it is usually necessary to rip the cemented pan.

Interpretive Groups

Land capability classification: VIIe, nonirrigated

MLRA: 30

Prime farmland: no

292 - Lewkalb-Urban land complex, 0 to 5 percent slopes

Setting

Landform: alluvial plains and terraces

Description of area: These soils are too intricately intermingled to separate at the scale mapped

Elevation: 2,200 to 2,300 feet

Slope range: 0 to 5 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 66 degrees F

Frost-free period: 200 to 220 days

Composition

Lewkalb and similar inclusions: 50 percent

Urban Land and similar inclusions: 35 percent

Contrasting inclusions: 15 percent

Characteristics of the Lewkalb Soil

Position on landscape: alluvial plains and terraces

Slope: 0 to 5 percent

Parent material: granitic alluvium

Typical profile:

0 to 12 inches = pale brown sand

12 to 28 inches = pale brown loamy sand

28 to 49 inches = stratified pale yellow sandy loam to light brownish gray loam

49 to 60 inches = cemented hardpan

Depth class: deep

Drainage class: well drained

Permeability: moderate above the hardpan and slow or very slow in the hardpan

Available water capacity: low

Shrink-swell potential: low

Sodicity (SAR): 2 to 15 from 0 to 28 inches, 15 to 50 from 28 to 60 inches

Salinity: 0 to 4 mmhos/cm from 0 to 60 inches

Depth to hardpan: 40 to 60 inches

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare, flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: $K = .15$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 180$

Hazard of wind erosion in bare areas: severe

Characteristics of the Urban Land

Slope: 0 to 5 percent

Description: areas covered by impervious surfaces including buildings, roads, parking lots, sidewalks etc.

Surface runoff: rapid

Contrasting inclusions:

Alko soils

Cajon soils

Neuralia soils

Soils similar to Lewkalb except that they are saline-sodic throughout

Rock Outcrop

Use and Management

Land use: homesite development

Homesite development

Major management factors: rare hazard of flooding, sodicity, cemented pan and hazard of soil blowing

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted salt and drought tolerant plants are best suited.
- * In order for septic tank absorption fields to function properly, it is usually necessary to rip the cemented pan.

Interpretive Groups

Land capability classification: Lewkalb soil VIIe, nonirrigated; Urban land VIII

MLRA: 30

Prime farmland: no

112 - Neuralia sand, 2 to 5 percent slopes

Setting

Landform: alluvial fans

Elevation: 2,200 to 2,400 feet

Slope range: 2 to 5 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Neuralia and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Neuralia Sand Soil

Parent material: granitic alluvium

Typical profile:

0 to 19 inches = pale brown and yellowish brown sand

19 to 25 inches = brown sandy loam

25 to 36 inches = strong brown gravelly sandy clay loam

36 to 60 inches = stratified light brown gravelly coarse sand and coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: slow

Erosion factors: $K = .15$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 180$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Helendale soils

Cerrocoso soils

Soils with slopes of less than 2 percent and more than 5 percent

Use and Management

Land use: Wildlife habitat, rangeland and homesite development

Rangeland

Common plants: creosotebush, white bursage, allscale saltbush and filaree

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.

- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, shrink-swell, hazard of soil blowing, percolates slowly in the gravelly sandy clay loam layer and poor filter in the lowest layers

Management considerations:

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification:

VIIe, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed water supply that is dependable

113 - Neuralia sand, 5 to 9 percent slopes

Setting

Landform: alluvial fans

Elevation: 2,300 to 2,800 feet

Slope range: 5 to 9 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Neuralia Sand and similar inclusions: 85 percent

Contrasting inclusions: 15 percent

Characteristics of the Neuralia Soil

Parent material: granitic alluvium

Typical profile:

0 to 12 inches = pale brown sand

12 to 22 inches = brown sandy loam

22 to 39 inches = strong brown gravelly sandy clay loam

39 to 60 inches = stratified light brown gravelly loamy coarse sand and coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: medium

Erosion factors: $K = .15$; $T = 3$

Hazard of water erosion in bare areas: moderate

Wind erodibility index: $I = 180$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cerrocoso soils

Helendale soils

Garlock soils

Soils with slopes less than 2 percent and greater than 9 percent

Use and Management

Land use: Wildlife habitat, rangeland and homesite development

Rangeland

Common plants: creosotebush, white bursage, allscale saltbush and filaree

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.

- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: shrink-swell, hazard of soil blowing, percolates slowly in the gravelly sandy clay loam layer and poor filter in the lowest layers

Management considerations:

- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Vlle, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

111 - Neuralia Loamy Sand, 0 to 2 percent slopes

Setting

Landform: alluvial fans

Elevation: 2,200 to 2,300 feet

Slope range: 0 to 2 percent

Vegetation: mainly desert shrubs and grasses

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Neuralia Loamy Sand and similar inclusions:

85 percent

Contrasting inclusions: 15 percent

Characteristics of the Neuralia Soil

Parent material: granitic alluvium

Typical profile:

0 to 15 inches = pale brown loamy sand

15 to 25 inches = brown sandy loam

25 to 33 inches = strong brown gravelly sandy clay loam

33 to 60 inches = stratified light brown gravelly coarse sand to loamy sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: $K = .20$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 134$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Helendale soils

Cerrocoso soils

Neuralia loamy substrata soils

Use and Management

Land use: Wildlife habitat, rangeland and homesite development

Rangeland

Common plants: creosotebush, white bursage, allscale saltbush and red brome

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.

* Uniform distribution of grazing is difficult because of the lack of permanent water developments.

* Promote uniform grazing by properly distributing watering facilities.

Homesite development

Major management factors: rare hazard of flooding, shrink-swell, hazard of soil blowing, percolates slowly in the gravelly sandy clay loam layer and poor filter in the lowest layers

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: VIIe, nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a developed irrigation water supply that is dependable

170 - Neuralia loamy sand, cobbly substratum, 0 to 5 percent slopes

Setting

Landform: alluvial fans and alluvial plains

Elevation: 2,200 to 2,600 feet

Slope range: 0 to 5 percent

Vegetation: mainly desert shrubs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Neuralia loamy sand and similar inclusions:

85 percent

Contrasting inclusions: 15 percent

Characteristics of the Neuralia Soil

Parent material: granitic alluvium

Typical profile:

0 to 6 inches= brown loamy sand

6 to 10 inches= brown sandy loam

10 to 33 inches= brown sandy clay loam

33 to 45 inches= strong brown gravelly
loamy coarse sand

45 to 60 inches= strong brown very cobbly
loamy coarse sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare, flooding is more likely to
occur in and along drainage channels and
in depressions

Erosion factors: $K = .20$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 134$

Hazard of wind erosion in bare areas: severe

Contrasting inclusions:

Cajon soils

Cerrocoso soils

Helendale soils

Neuralia soils

Soils similar to Neuralia except that they have
more than 35 percent gravel throughout
the profile

Soils with slopes greater than 5 percent

Use and Management

Land use: wildlife habitat, construction
materials (cobbles), rangeland, and
homesite development

Rangeland

Common plants: creosotebush, white bursage
and allscale saltbush

Major management factors: low precipitation

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that tolerate drought and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, shrink-swell, hazard of soil blowing, percolates slowly in the layer with moderately slow permeability and poor filter in the lower layers.

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Vlle,
nonirrigated

MLRA: 30

Prime farmland: yes, if the area has a
developed irrigation water supply that is
dependable

114 - Neuralia-Urban land complex, 0 to 5 percent slopes

Setting

Landform: alluvial plains and terraces

Description of area: The soils are too intricately intermingled to separate at the scale mapped.

Elevation: 2,200 to 2,300 feet

Slope range: 0 to 5 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 225 days

Composition

Neuralia and similar inclusions: 50 percent

Urban Land and similar inclusions: 35 percent

Contrasting inclusions: 15 percent

Characteristics of the Neuralia Soil

Slope: 0 to 5 percent

Parent material: granitic alluvium

Typical profile:

0 to 15 inches = pale brown loamy sand

15 to 24 inches = brown sandy loam

24 to 33 inches = strong brown gravelly sandy clay loam

33 to 60 inches = stratified light brown gravelly coarse sand to loamy sand

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare; flooding is more likely to occur in and along drainage channels and depressions

Erosion factors: $K = .20$; $T = 3$

Hazard of water erosion in bare areas: slight

Wind erodibility index: $I = 134$

Hazard of wind erosion in bare areas: severe

Characteristics of the Urban Land

Slope: 0 to 5 percent

Description: areas covered by impervious surfaces including buildings, roads, parking lots, sidewalks etc.

Surface runoff: rapid

Contrasting inclusions:

Alko soils

Cerrocoso soils

Stratified saline-sodic soils

Use and Management

Land use: Homesite development and wildlife habitat

Homesite development

Major management factors: rare hazard of flooding, shrink-swell, hazard of soil blowing, percolates slowly in the gravelly sandy clay loam layer and poor filter in the lowest layers

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Neuralia soil VIIe, nonirrigated; Urban land VIII

MLRA: 30

Prime farmland: no

150 - Pits

Setting

Description of area: This map unit consists of open excavations from which most of the surface soil material has been removed. In many places rock, sand or gravel is exposed. These areas support little vegetation and are irregular in shape.

Elevation: 2,000 to 2,400 feet
Slope range: 0 to 5 percent

Use and Management

Land use: Borrow pits

Interpretive Groups

Land capability classification: VIII
MLRA: 30
Prime farmland: no

140 - Playas

Setting

Description of area: This map unit consists of dry lakes and other small depressions that have little or no vegetation due to high content of soluble salts. These areas are partly flooded and ponded following precipitation. The areas are irregular in shape.

Elevation: 1,850 to 2,200 feet
Slope range: 0 to 1 percent

Use and Management

Land use: wildlife habitat and extraction of salts

Interpretive Groups

Land capability classification: VIII
MLRA: 30
Prime farmland: no

165 - Rosamond very fine sandy loam, 0 to 2 percent slopes

Setting

Landform: lower margins of alluvial fans
Elevation: 1,900 to 2,300 feet
Slope range: 0 to 2 percent
Vegetation: mainly desert shrubs and forbs
Mean annual precipitation: 3 to 5 inches
Mean annual temperature: 62 to 65 degrees F
Frost-free period: 210 to 230 days

Composition

Rosamond and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of the Rosamond Soil

Parent material: granitic alluvium
Typical profile:

0 to 6 inches = pale brown very fine sandy loam

6 to 60 inches = stratified pale brown loam to yellowish brown silty clay loam

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: moderate

Shrink-swell potential: moderate

Sodicity (SAR): 2 to 15 from 0 to 6 inches, 12 to 30 from 6 to 60 inches

Salinity: 4 to 32 mmhos/cm

Depth to bedrock: more than 60 inches

Surface runoff: slow

Flooding: rare, flooding is more likely to occur in and along drainage channels and in depressions

Erosion factors: K = .37; T = 5

Hazard of water erosion in bare areas: slight

Wind erodibility index: I = 86

Hazard of wind erosion in bare areas: moderate

Contrasting inclusions:

Cajon soils

Lewkalb soils

Helendale soils

Soils similar to Rosamond except that they have a sandy texture below 20 to 50 inches and Playas

Use and Management

Land use: wildlife habitat, rangeland, and homesite development

Rangeland

Common plants: shadscale, desert alysum, allscale saltbush and iodinebush

Major management factors: low precipitation and excess salts

Management considerations:

- * Seed the bare areas of the range if the plant cover is not sufficient to protect the soil from wind erosion.
- * Suitable plants to establish are those that are salt tolerant, drought tolerate and control blowing sand.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation.
- * Uniform distribution of grazing is difficult because of the lack of permanent water developments.

Homesite development

Major management factors: rare hazard of flooding, percolates slowly, shrink-swell, hazard of soil blowing in disturbed areas and excess salts

Management considerations:

- * Roads and structures should be located above the expected flood level.
- * If the density of houses is high and ground water is relatively shallow, community sewage systems may be needed to prevent the possibility of septic tank effluent contaminating groundwater into groundwater below nearby Playas.
- * Vegetation should be reestablished in disturbed areas to reduce soil blowing. The hazard of soil blowing greatly increases if the surface is disturbed. Irrigation and fertilizer are needed to establish landscaping plants. Climatically adapted salt and drought tolerant plants are best suited.
- * Septic tank absorption lines should be placed below the layer with moderately slow permeability.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: VIIIs, nonirrigated

MLRA: 30

Prime farmland: no

190 - Sparkhule-Rock outcrop association, 15 to 50 percent slopes

Setting

Landform: hills

Elevation: 2,600 to 3,000 feet

Slope range: 15 to 50 percent

Vegetation: mainly desert shrubs and forbs

Mean annual precipitation: 3 to 5 inches

Mean annual temperature: 62 to 65 degrees F

Frost-free period: 200 to 240 days

Composition

Sparkhule very cobbly sandy loam and similar inclusions: 50 percent

Rock outcrop: 35 percent

Contrasting inclusions: 15 percent

Characteristics of the Sparkhule Soil

Position on landscape: hillslopes

Slope: 15 to 50 percent

Parent material: granodiorite and volcanic rocks

Important surface feature: The soil surface is covered with 35 to 50 percent rock fragments mainly gravel and cobbles

Typical profile:

0 to 2 inches = yellowish brown very cobbly sandy loam

2 to 12 inches = brown gravelly sandy clay loam

12 to 15 inches = soft weathered granodiorite

15 inches = hard fractured granodiorite

Depth class: shallow

Drainage class: well drained

Permeability: moderately slow

Available water capacity: low

Shrink-swell potential: moderate

Depth to bedrock: 12 to 20 inches

Surface runoff: rapid

Erosion factors: K = .15; T = 1

Hazard of water erosion in bare areas: severe

Wind erodibility index: I = 56

Hazard of wind erosion in bare areas: slight

Characteristics of the Rock Outcrop Soil

Position on landscape: along ridges and summits

Surface runoff: very rapid

Hazard of erosion: none

Contrasting inclusions:

Cajon soils in drainages

Soils similar to Sparkhule except that they have more than 35 percent rock fragments throughout the profile

Soils with a texture of gravelly sandy loam throughout

Soils with slopes less than 15 percent and greater than 50 percent

Soils more than 20 inches deep to bedrock

Use and Management

Land use: wildlife habitat, rangeland and homesite development

Rangeland

Common plants: creosotebush, filaree and white bursage

Major management factors: low precipitation, slope greater than 30 percent, low available water capacity, shallow depth, hazard of severe water erosion and rock outcrop

Management considerations:

- * To control erosion and provide wildlife habitat, woody plants should be left in the drainageways and in the steeper areas.
- * Avoid loss of the surface layer to prevent a serious decrease in productivity and in the potential of the soils to produce plants for grazing.
- * Stones, cobbles and rocks limit access by livestock for most of this unit.
- * Reseeding to increase forage production for livestock is not feasible due to low precipitation, shallow depth to rock and slope.
- * Suitable plants to establish are those that are drought tolerant.

Homesite development

Major management factors: Slope, shallow depth, percolates slowly and shrink-swell

Management considerations:

- * Extensive leveling is required for housing construction.
- * Septic tank absorption lines should be placed on the contour.
- * Limitations due to slow percolation and shallow depth can be overcome by making sure the septic tank absorption fields are large enough to provide sufficient capacity for the effluent.
- * The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

Interpretive Groups

Land capability classification: Sparkhule soil VIIe, nonirrigated; Rock outcrop VIII

MLRA: 30

Prime farmland: no

200 - Urban land

Setting

Description of area: This map unit consists of areas covered by asphalt, concrete, buildings, or other impervious surfaces. Examples are airports, parking lots, shopping and business centers, and industrial parks. In most places 90 percent or more of the surface is covered by impervious surfaces. These areas are mainly located near the cities of Inyokern and Ridgecrest. In most areas, some or all of the soil profile has been altered or removed. The soil material under the impervious surface resembles nearby soils including Cajon, Cerrocoso, and Helendale.

Flooding: rare, flooding is more likely to occur near drainage channels and in depressions.

Contrasting inclusions:

Cajon soils
Neuralia soils
Helendale soils
Cajon soils, occasionally flooded

Interpretive Groups

Land capability classification: VIII

MLRA: 30

Prime farmland: no

175 - Water, disposal ponds

Setting

Description of area: This map unit consists of areas covered by water and water impoundment structures. These areas have been altered in the process of constructing sewage disposal ponds. In most areas, some or all of the soil profile has been altered or removed. The soil material resembles nearby soils including Lewkalb, Alko and Cajon.

Interpretive Groups

MLRA: 30

Prime farmland: no

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

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

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

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

Crops

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

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

Yields per Acre

The average yields per acre that can be expected of the principal irrigated crops under a high level of management are shown in table B. In any given year, yields may be higher or

lower than those indicated in the table because of variations in irrigation, rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

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

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include irrigation drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss. It is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

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

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

Land Capability Classification

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

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. In the tables, only capability class and subclass are used. In the map unit descriptions capability class, subclass and unit are used. Capability unit is only used for soils that are irrigated.

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

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

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

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly or completely preclude their use for commercial crop production.

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, VIIe. 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 and the soil lacks other limitations.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by w, s, or c because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, 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, IIIs-0 and IVs-4. The numbers used to designate units within the subclasses are as follows:

0. Indicates limitations caused by coarse sandy, very cobbly, or very gravelly material in the underlying material.
1. Indicates a limitation caused by slope or by an actual or potential erosion hazard.
2. Indicates a limitation of wetness caused by poor drainage or flooding.
3. Indicates a limitation of slow or very slow permeability of the subsoil or the underlying material.
4. Indicates a low available water capacity in sandy or gravelly soils.
5. Indicates limitations caused by a fine textured or very fine textured surface layer.
6. Indicates limitations caused by salts or sodium.
7. Indicates limitations caused by rocks, stones, or cobbles that interfere with tillage.
8. Indicates that the soil has a very low or low available water capacity because the root zone generally is less than 40 inches deep over massive bedrock.
9. Indicates that a hazard or limitation is caused by low or very low fertility, acidity, or toxicity that cannot be corrected by adding normal amounts of fertilizer, lime, or other amendments.

10. Indicates a hazard of subsidence, susceptibility to burning, or a hazard of soil blowing caused by a high content of organic matter, peat or muck.

The irrigated and nonirrigated capability classification is given in the Land Capability Classes and Yields Table. Only nonirrigated capability classes are used for soils that are not commonly irrigated.

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, forest land, 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. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

The map units in the survey area that could be considered prime farmland, if irrigated, are listed at the end of this section. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures and if an adequate supply of irrigation water is available. Many areas do not have a developed irrigation water supply. The extent of each listed map unit is shown in table A. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Only a few areas have a developed dependable water supply. The map units that would meet the requirements for prime farmland if they are irrigated and if they have a dependable water supply are:

- 121 - Garlock coarse sand, 0 to 2 percent slopes
- 122 - Garlock coarse sand, 2 to 5 percent slopes
- 159 - Garlock complex, 2 to 5 percent slopes
- 116 - Helendale sand, 0 to 2 percent slopes
- 117 - Helendale sand, 2 to 5 percent slopes
- 155 - Helendale loamy sand, 0 to 2 percent slopes
- 156 - Helendale loamy sand, 2 to 5 percent slopes
- 112 - Neuralia sand, 2 to 5 percent slopes
- 113 - Neuralia sand, 5 to 9 percent slopes
- 111 - Neuralia loamy sand, 0 to 2 percent slopes
- 170 - Neuralia loamy sand, cobbly substratum, 0 to 5 percent slopes

Rangeland

Approximately 25 percent of the Ridgecrest survey area is rangeland. Livestock grazing is not the principal use with recent conversions to home site development and public recreation. Scattered areas are used mainly by sheep during the spring months when plant growth is at its peak. Livestock owners generally lease grazing rights on public controlled lands. When the available rangeland forage is gone, livestock graze in areas outside the survey area.

Creosotebush (*Larrea divarica*) is the most common shrub with herbaceous, annual and perennial plant species in the understory. As soil salinity increases in lower elevation areas near playas, creosotebush becomes less common and more salt tolerant species including shadscale (*Atriplex confertifolia*) and allscale (*Atriplex polycarpa*) become more common. Higher levels of soil salinity in playas account for the general absence of vegetation although some areas do have a few salt tolerant species.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table C shows, for each soil that supports rangeland vegetation suitable for grazing; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. An explanation of the column headings in table C follows.

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

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation: the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil listed by common name. *Under composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only.

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

Recreation

The soils of the survey area are rated in table G according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as 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 are also important. Soils 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.

In table G, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

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

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 best soils have mild slopes and are not wet or subject to flooding during the period of use. The

surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

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

In table 1, the soils in the survey area are interpreted as a habitat component according to the soils potential to be used by mammals and species of reptiles that excavate burrows. Burrows are considered a necessary part of specific local habitat requirements for certain species of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas and in selecting soils that are suitable for establishing, improving or maintaining specific elements of wildlife habitat.

The potential of the soil is rated well suited, suited or poorly suited. A rating of *well suited* indicates that the habitat is easily established, improved or maintained. Few or no limitations affect management, and satisfactory results can be expected. Colonization and population densities may be above average if other habitat factors are not limiting. A rating of *suited* indicates that the habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. Colonization and population densities may be average for the area if the other habitat requirements are met. A rating of *poorly suited* indicates that the soil characteristics are such that they may limit establishment, maintenance, or use of the site by burrowing species. Colonization and population densities may be restricted in the area due to the limiting factors even though all of the other species habitat requirements are met.

Several assumptions are made about the rating criteria in the table. Some of these are described as follows:

1. In areas subject to flooding, the burrowing mammals and reptiles are evicted, species are drowned, and the walls of the burrows may collapse or become filled with debris. Any effort of the animals to return to the site is delayed until the floodwater has receded and the soils have dried sufficiently to allow renewed activity.
2. Sandy layers are soft and loose. Burrow excavation and maintenance are problems due to reduced sidewall stability and the tendency for collapse.
3. Clayey layers are slippery and sticky when wet and, when dry, are usually hard. They affect the ability of the burrowing species to excavate.
4. The effort to dislodge or transport rock fragments from the burrow may be beyond the abilities of many species.
5. Bedrock, a cemented pan, or dense layers adversely affect the potential depth of excavation by burrowing species.

Engineering

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

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

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

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

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

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

Building Site Development

Table M shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

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 stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and

observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table L shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table L also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

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. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table L gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive 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.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill-trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the 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.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table L are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

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 final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Water Management

Table P gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees. The limitations are considered *slight* if soil properties and

site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind

erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

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

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

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

Engineering Index Properties

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

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

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

Classification of the soils is determined according to the Unified soil classification system (20) and the system adopted by the American Association of State Highway and Transportation Officials (2).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic

matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

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

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

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

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

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

Physical and Chemical Properties

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

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major 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 greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are

used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water 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 major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. 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.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major 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.

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

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, more than 6 percent; and *very high*, greater than 9 percent.

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) 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 (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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 resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Sands, fine sands, and very fine sands.
2. Coarse sands, Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Soils in wind erodibility groups 1 and 2 have a severe hazard of wind erosion. Wind erodibility groups 3, 4L and 4 have a moderate hazard of wind erosion; groups 5, 6 and 7 have a slight hazard of wind erosion and group 8 has no hazard of erosion

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table J, 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 or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

Flooding, the temporary inundation of an area, is caused by overflowing streams, or runoff from adjacent slopes. 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.

Table K gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding 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 flooding 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 flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

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

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

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

"More than 6.0" indicates that the water table is below a depth of 6 feet.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A *cemented pan* is a cemented or indurated subsurface layer within a depth of 5 feet. Such a pan causes difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (23). 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 Q shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven 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 Aridisol.

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 Argid (Arg, meaning an argillic horizon with more clay, plus id, from Aridisol).

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 Haplargid (*Hapl*, meaning minimal horizonation, plus argid, the suborder of the Aridisols that has an argillic horizon).

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 Haplargids.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, thermic Typic Haplargids.

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. An example is the Helendale series.

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" (28). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (23) and in "Keys to Soil Taxonomy" (27). Unless otherwise indicated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Alko Series

The Alko series consists of shallow, well drained soils on alluvial plains and alluvial fans. These soils formed in alluvium derived dominantly from granitic rock. Slopes range from 0 to 5 percent in the Northeastern Kern Area, but 0 to 2 percent in the Ridgecrest Part.

Taxonomic Class: loamy, mixed, thermic, shallow Typic Durorthids.

Typical pedon of Alko loamy coarse sand occurs in the China Lake Naval Weapons Center Part of the Northeastern Kern Area in an area of Alko-Urban land complex, 0 to 5 percent slopes; about 800 feet east and 2,500 feet north of the southwest corner of section 23, T. 26 S., R. 40 E., Ridgecrest North, California Quadrangle:

A1 – 0 to 1 inch; pale brown (10YR 6/3) loamy coarse sand, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; few very fine interstitial pores; 2 percent gravel; strongly effervescent disseminated carbonates; moderately alkaline; clear smooth boundary.

A2 – 1 to 6 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; massive; slight hard, friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; 5 percent gravel; violently effervescent, disseminated carbonates; moderately alkaline; clear wavy boundary.

Bk – 6 to 15 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; few very fine roots; common very fine interstitial and few very fine tubular pores; 5 percent gravel; violently effervescent, carbonates disseminated and segregated in common hard masses; moderately alkaline; clear smooth boundary.

Bkqm – 15 to 28 inches; light yellowish brown (10YR 6/4) indurated carbonate and silica cemented duripan, dark yellowish brown (10YR 4/4) moist; extremely hard and very firm.

C – 28 to 60 inches; pale brown (10YR 6/3) loamy coarse sand, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; hard, friable, nonsticky and nonplastic; common very fine interstitial and few very fine tubular pores; 8 percent gravel; violently effervescent, carbonates disseminated and segregated in few hard masses; moderately alkaline; clear smooth boundary.

The soil moisture control section is moist for less than 90 days in most years. Depth to the hardpan ranges from 10 to 20 inches.

The A horizon has dry color of 10YR 6/3, 6/4 or 7/3. Moist color is 10YR 4/3 or 5/3. Effervescence is strong or violent.

The B and C horizons have dry color of 10YR 6/3, 6/4, 7/3 or 7/4. Moist color is 10YR 4/4, 5/3 or 5/4. Texture averages sandy loam or coarse sandy loam above the hardpan with other textures included below the hardpan. Effervescence is strong or violent.

Arizo Series

The Arizo series consists of very deep, excessively drained soils on dissected alluvial fans. These soils formed in alluvium mainly from granitic rock. Slopes range from 2 to 9 percent.

Taxonomic Class: sandy-skeletal, mixed, thermic Typic Torriorthents.

Typical pedon of Arizo very cobbly coarse sand, 2 to 9 percent slopes, occasionally flooded; 600 feet east of the intersection of Highway 395 and Athel Road and 100 feet north of Athel Road; 200 feet east and 100 feet north of the southwest corner of Section II, T. 26 S., R. 38 E., Inyokern, California Quadrangle:

- A/ – 0 to 8 inches; brown (10YR 5/3) very cobbly coarse sand, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 30 percent cobbles, 15 percent gravel, and 2 percent stones; slightly alkaline; clear smooth boundary.
- C1 – 8 to 16 inches; brown (10YR 5/3) very gravelly sand, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard; very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 38 percent gravel; slightly alkaline; abrupt smooth boundary.
- C2 – 16 to 31 inches; yellowish brown (10YR 5/4) gravelly sand, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few fine and very fine interstitial pores; 30 percent gravel; slightly effervescent, carbonates disseminated; slightly alkaline; clear wavy boundary.
- C3 – 31 to 42 inches; light yellowish brown (10YR 6/4) very gravelly loamy coarse sand, dark yellowish brown (10YR 4/6) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 10 percent cobbles and 40 percent gravel; slightly effervescent, carbonates disseminated; moderately alkaline; clear wavy boundary.
- C4 – 42 to 51 inches; yellowish brown (10YR 5/6) gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; few very fine interstitial pores; 33 percent gravel; slightly effervescent, carbonates disseminated; slightly alkaline; gradual smooth boundary.

C5 – 51 to 60 inches; light yellowish brown (10YR 6/4) very gravelly coarse sand, yellowish brown (10YR 5/4) moist; single grained; loose, nonsticky and nonplastic; common Very fine and few fine roots; few very fine interstitial pores; 36 percent gravel; slightly effervescent, carbonates disseminated; slightly alkaline.

The soil is not continually moist for as long as 90 consecutive days. A few stones occur on the surface, and they are scattered 20 to 200 feet apart. Rock fragments in the profile are mostly gravel and cobbles. Evidence of stratification is found in most profiles. The reaction is slightly or moderately alkaline.

The A horizon has dry color of 10YR 5/3, 5/4, 6/3 or 6/6. Moist color is 10YR 4/4, 4/6, 5/3, 5/4 or 5/6. Rock fragments are 35 to 50 percent and are mostly cobbles and gravel.

The C horizon has dry color of 10YR 5/3, 5/4, 5/6, 6/3 or 6/4. Moist color is 10YR 3/3, 3/4, 4/4, 4/6, 5/3 or 5/4. Stratification is common with textures of coarse sand, sand, loamy coarse sand or loamy sand with an average of 35 to 50 percent rock fragments.

Cajon Series

The Cajon series consists of very deep, somewhat excessively drained soils on alluvial fans and alluvial plains. These soils formed in alluvium weathered mainly from granitic rock. Slopes range from 0 to 15 percent.

Taxonomic Class: mixed, thermic Typic Torripsamments.

Typical pedon of Cajon sand, 0 to 2 percent slopes; about 200 feet south and 100 feet east of the northwest corner of section 2, T. 25 S., R. 38 E., Little Lake, California Quadrangle:

A – 0 to 7 inches; yellowish brown (10YR 5/4) sand, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few medium and fine and common very fine roots; common very fine interstitial pores; 12 percent gravel; moderately alkaline; gradual smooth boundary.

C1 – 7 to 25 inches; yellowish brown (10YR 5/4) sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few medium and common fine and very fine roots; few very fine interstitial pores; 12 percent gravel; slightly effervescent, disseminated carbonates; moderately alkaline; gradual smooth boundary.

C2 – 25 to 55 inches; yellowish brown (10YR 5/4) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and common very fine roots; few very fine interstitial pores; 10 percent gravel; strongly effervescent, disseminated carbonates; slightly alkaline; clear smooth boundary.

C3 – 55 to 60 inches; yellowish brown (10YR 5/4) gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and common very fine roots; few very fine interstitial pores; 16 percent gravel; strongly effervescent, disseminated carbonates; slightly alkaline.

The soil moisture control section is not continually moist for as long as 75 days in most years. Rock fragments are mostly gravel and they are 5 to 30 percent of the soil. Weak stratification is usually present. The profile is slightly or moderately alkaline.

The A horizon has dry color of 10YR 5/3, 5/4, 5/6, 6/3, 6/4 or 7/3. Moist color is 10YR 4/2, 4/3, 4/4, or 5/3. It is sand, loamy sand, sandy loam, gravelly sand or gravelly loamy sand.

The C horizon has dry color of 10YR 5/4, 6/3, 6/4; 7/3 or 7/4. Moist color is 10YR 4/2, 4/3, 4/4 or 5/3. It is sand, coarse sand, loamy fine sand, loamy sand, or loamy coarse sand. Some areas are gravelly.

Cerrocoso Series

The Cerrocoso series consists of very deep, well drained, sodic soils on alluvial fans and fan terraces. These soils formed in alluvium weathered mainly from granitic rock. Slopes range from 0 to 5 percent.

Taxonomic Class: fine-loamy, mixed, thermic Duric Natrargids.

Typical pedon of Cerrocoso gravelly sandy loam, 0 to 2 percent slopes; about 1,100 feet east and 200 feet south of the northeast corner of section 10, T. 27 S., R. 39 E.; Inyokern South, California Quadrangle:

- A – 0 to 3 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine roots; few very fine interstitial pores; 20 percent gravel; slightly alkaline; abrupt smooth boundary.
- 2Bt – 3 to 11 inches; reddish brown (5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; strong coarse prismatic and moderate medium angular blocky structure; hard, friable, sticky and plastic; many very fine roots; common very fine tubular pores; common thin and few moderately thick clay films in pores and on peds; 5 percent gravel; strongly effervescent, carbonates disseminated; strongly alkaline; clear smooth boundary.
- 2Btkn1 – 11 to 15 inches; brown (7.5YR 5/4) sandy clay, dark brown (7.5YR 4/4) moist; weak coarse prismatic and moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common very fine tubular pores; common thin clay films in pores and on peds; 5 percent gravel; strongly effervescent, carbonates segregated in few fine filaments; strongly alkaline; clear smooth boundary.
- 2Btkn2 – 15 to 21 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; few very fine interstitial and tubular pores; common thin clay films in pores and few thin clay films bridging mineral grains; 5 percent gravel; strongly effervescent, carbonates segregated in common fine filaments; strongly alkaline; gradual smooth boundary.
- 3BCqn – 21 to 27 inches; light brown (7.5YR 6/4) coarse sandy loam, dark brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; very hard, firm and brittle, slightly sticky and slightly plastic; few very fine roots; few very fine tubular and interstitial pores; few thin clay films bridging mineral grains; 10 percent gravel; a few aggregates do not slake in hydrochloric acid; slightly effervescent, carbonates disseminated; moderately alkaline; clear smooth boundary.

4Ckq1 – 27 to 33 inches; light brown (7.5YR 6/4) coarse sand, dark brown (7.5YR 4/4) moist; moderate medium platy and weak medium subangular blocky structure; hard, firm and brittle, nonsticky and nonplastic; few very fine interstitial and tubular pores; 10 percent gravel; some aggregates do not slake in hydrochloric acid; strongly effervescent, carbonates segregated in common medium seams and concretions; moderately alkaline; clear smooth boundary.

5Ckq2 – 33 to 60 inches; pinkish white (7.5YR 8/2) very gravelly coarse sand, light brown (7.5YR 6/4) moist; weak moderate subangular blocky structure; hard, firm and brittle, nonsticky and nonplastic; few very fine interstitial pores; 40 percent gravel; some aggregates do not slake in hydrochloric acid; violently effervescent, carbonates segregated in common medium seams and concretions; moderately alkaline.

The natric horizon has a SAR of 13 to 20 in at least part of the horizon. In some areas part of the natric horizon has a SAR of less than 13. Depth to the firm brittle layer is 6 to 34 inches. The soil from a depth of 8 to 22 inches is moist in some part for less than 90 consecutive days. Reaction varies from mildly to strongly alkaline. Carbonates are absent in some areas.

The A horizon has a dry color of 10YR 5/3, 5/4, 5/6, 6/3, 6/4; or 7.5YR 6/4 and moist color of 10YR 3/3, 3/4, 4/3, 4/4, 4/6, 5/4 or 7.5YR 4/4. It is loamy sand or gravelly sandy loam.

The Bt horizon has a dry color of 7.5YR 4/4, 4/6, 5/4, 5/6, 6/4; or 5YR 4/4 and moist color of 10YR 4/4; 7.5YR 3/4, 4/4, 4/6, 5/6; or 5YR 3/4. It is sandy clay or sandy clay loam with 25 to 35 percent clay and 5 to 30 percent gravel and cobbles. In some pedons, part of the Bt is weakly cemented with silica. It is moderately or strongly alkaline.

The BC horizon, where present, has a dry color of 7.5YR 4/6, 5/4, 6/4 or 6/6 and moist color of 7.5YR 4/4 or 4/6. It has 10 to 20 percent clay. The BC horizon is weakly cemented in at least part of the horizon.

The C horizon has a dry color of 10YR 6/4, 6/6, 7/3; 7.5YR 4/6, 5/4, 5/6, 6/2, 6/4, or 8/2 and moist color of 10YR 4/4, 5/4, 5/6, 6/4; 7.5YR 4/4, 4/6, or 6/4. It is stratified with sand, coarse sand, loamy sand, or loamy coarse sand with 5 to 55 percent gravel and cobbles. It is weakly cemented with silica in some part.

Garlock Series

The Garlock series consists of very deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium weathered mainly from granitic rock. Slopes range from 0 to 5 percent.

Taxonomic Class: fine-loamy, mixed, thermic Typic Haplargids.

Typical pedon of Garlock coarse sand, 2 to 5 percent slopes; about 400 feet northeast of the junction of Highway 395 and Athel Road; about 250 feet north and 2,200 feet east of the southwest corner of section 12, T. 26 S., R. 38 E.; Inyokern, California Quadrangle:

A – 0 to 4 inches; brown (10YR 5/3) coarse sand, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; 5 percent gravel; moderately alkaline; gradual smooth boundary.

2BA_t – 4 to 13 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, slightly sticky and slightly plastic, few fine and very fine roots; common very fine interstitial and few very fine tubular pores; few thin clay films bridging mineral grains; 5 percent gravel; moderately alkaline; abrupt wavy boundary.

2B_t – 13 to 39 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; very hard, friable, sticky and slightly plastic; common very fine roots; common very fine tubular and few very fine interstitial pores; common moderately thick clay films bridging sand grains and lining pores; 5 percent gravel; moderately alkaline; clear wavy boundary.

3C – 39 to 51 inches; yellowish brown (10YR 5/4) gravelly coarse sand, dark yellowish brown (10YR 3/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; common very fine interstitial pores; 15 percent gravel; moderately alkaline; gradual smooth boundary.

3B_k – 51 to 60 inches; yellowish brown (10YR 5/4) gravelly coarse sand, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, nonsticky and nonplastic; few very fine interstitial pores; 20 percent gravel; strongly effervescent, carbonates disseminated and segregated as coatings on gravel; moderately alkaline.

The soil moisture control section is not moist for as long as 90 consecutive days. Reaction ranges from neutral to moderately alkaline. Carbonates occur below a depth of 40 inches in some areas.

The A horizon has dry color of 10YR 5/3, 5/4, 6/3, 6/4; or 7.5YR 5/4. Moist color is 10YR 4/2, 4/3, 4/4, 5/4; or 7.5YR 4/4. It has 2 to 15 percent rock fragments.

The B_t horizon has dry color of 10YR 5/3, 5/4; 7.5YR 5/4, or 5/6. Moist color is 10YR 4/3, 4/4, 4/6; 7.5YR 4/4 or 4/6. It is sandy loam, sandy clay loam or gravelly sandy clay loam with 2 to 20 percent rock fragments.

The C horizon has dry color of 10YR 5/4, 5/6, 6/6; 7.5YR 5/4, 5/6 or 6/6. Moist color is 10YR 3/4, 4/4, 5/4; 7.5YR 4/4, 5/4 or 5/6. It is gravelly coarse sand, gravelly loamy coarse sand or loamy coarse sand with 10 to 35 percent rock fragment. Some areas have a brittle, hard substratum that occurs at some depth between 40 and 60 inches.

Helendale Series

The Helendale series consists of very deep, well drained soils on alluvial fans and alluvial plains. These soils formed in alluvium weathered mainly from granitic rock. Slopes range from 0 to 5 percent.

Taxonomic Class: coarse-loamy, mixed, thermic Typic Haplargids.

Typical pedon of Helendale sand, 0 to 2 percent slopes; about 500 feet north and 2,500 feet east of the southwest corner of section 16, T. 27 S., R. 39 E., Inyokern SE, California Quadrangle:

A1 – 0 to 4 inches; brown (10YR 5/3) sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; few very fine interstitial pores; 5 percent gravel; moderately alkaline; abrupt smooth boundary.

A2 – 4 to 12 inches; light yellowish brown (10YR 6/4) sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic, common very fine roots; few very fine interstitial pores; 5 percent gravel; moderately alkaline; clear smooth boundary.

BAt – 12 to 22 inches; reddish yellow (7.5YR 6/6) sandy loam, strong brown (7.5YR 5/6) moist; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; common very fine roots; few very fine interstitial pores; 5 percent gravel; moderately alkaline; gradual smooth boundary.

Bt – 22 to 29 inches; reddish yellow (7.5YR 6/6) sandy loam, strong brown (7.5YR 5/6) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; few very fine roots; common very fine interstitial pores; 5 percent gravel; few thin clay films bridging mineral grains; moderately alkaline; clear wavy boundary.

Btk – 29 to 43 inches; reddish yellow (7.5YR 6/6) sandy loam, strong brown (7.5YR 5/6) moist; weak very coarse subangular block structure; very hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine interstitial and common very fine tubular pores; 8 percent gravel; common thin clay films bridging mineral grains; strongly effervescent, carbonates disseminated and segregated in few fine filaments and seams; moderately alkaline; clear wavy boundary.

Bk – 43 to 48 inches; reddish yellow (7.5YR 7/6) loamy coarse sand, yellowish brown (10YR 5/6) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 10 percent gravel; violently effervescent, disseminated carbonates; moderately alkaline; abrupt wavy boundary.

2C – 48 to 60 inches; reddish yellow (7.5YR 7/6) gravelly loamy coarse sand, yellowish brown (10YR 5/6) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 7 percent cobbles and 18 percent gravel; strongly effervescent, disseminated carbonates; moderately alkaline.

The soil moisture control section is moist for less than 90 consecutive days in most years. Reaction is slightly or moderately alkaline.

The A horizon has dry color of 10YR 5/3, 5/4, 6/3 or 6/4. Moist color is 10YR 4/3, 4/4, 5/3 or 5/4. Texture is sand or loamy sand. Gravel content is less than 15 percent.

The Bt horizon has dry color of 10YR 5/3, 5/4, 5/6; 7.5YR 5/4, 5/6, or 6/6. Moist color is 10YR 4/3, 4/4, 5/4 or 5/6; 7.5YR 4/4, 4/6, 5/4 or 5/6. It is sandy loam with 8 to 18 percent clay. Some areas lack carbonates in the Bt horizon. Some areas have brittle fragments in part of the Bt horizon.

The C horizon has dry color of 10YR 5/4, 5/6, 6/4; 7.5YR 5/4, 6/6 or 7/6. Moist color is 10YR 4/4, 4/6, 5/4, 5/6; 7.5YR 4/6, 5/4 or 6/4. It is loamy sand, loamy coarse sand or coarse sand. Some areas do not have carbonates in the C horizon. Rock fragment content is 15 to 35 percent.

Lavic Series

The Lavic series consists of very deep, moderately well drained soils on alluvial plains and basin rims. These soils formed in alluvial material weathered mainly from granitic rock. Slopes range from 0 to 5 percent.

Taxonomic Class: coarse-loamy, mixed, thermic Typic Calciorthids.

Typical pedon of Lavic sand, 0 to 2 percent slopes; about 1/4 mile southeast of Siebenthal Road and Brown-Inyokern Road; about 1000 feet north and 1300 feet east of the southwest corner of section 6, T. 25 S., R. 39 E.; Inyokern, California Quadrangle:

A – 0 to 5 inches; yellowish brown (10YR 5/4) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; 7 percent gravel; moderately alkaline; clear smooth boundary.

AB – 5 to 13 inches; yellowish brown (10YR 5/4) loamy sand brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial and common very fine tubular pores; 4 percent gravel; slightly effervescent, disseminated carbonates; moderately alkaline; abrupt smooth boundary.

2Bk1 – 13 to 19 inches; lightly gray (2.5Y 7/2) sandy loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; few fine and very fine roots; common very fine tubular and few very fine interstitial pores; 6 percent gravel; violently effervescent, disseminated carbonates, 15 percent lime concretions (1/4 to 3/4 inch); moderately alkaline; clear smooth boundary.

2Bk2 – 19 to 32 inches; light brownish gray (2.5Y 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; common very fine roots; common very fine tubular and few very fine interstitial pores; 10 percent gravel; violently effervescent, disseminated carbonates, moderately alkaline; abrupt smooth boundary.

2Bkqn1 – 32 to 37 inches; light brownish gray (2.5Y 6/2) loamy coarse sand, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm and brittle, slightly sticky and nonplastic; few very fine roots; common very fine tubular pores; 10 percent gravel; violently effervescent, carbonates disseminated and segregated in common medium filaments; moderately alkaline; clear smooth boundary.

2Bkqn2 – 37 to 57 inches; light brownish gray (2.5Y 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm and brittle; nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 7 percent gravel; violently effervescent, carbonates disseminated and segregated in many medium filaments and few fine soft masses, 20 percent lime concretions (1/4 to 3/4 inch); strongly alkaline; clear smooth boundary.

2Cn – 57 to 60 inches; light brownish gray (2.5Y 6/2) loamy sand, brown (10YR 4/3) moist; weak coarse subangular blocky structure; hard, friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 8 percent gravel; slightly effervescent, disseminated carbonates; strongly alkaline.

Depth to the firm, brittle layer is 10 to 36 inches and thickness ranges from 12 to 42 inches. Gravel content throughout the profile is 0 to 15 percent. The soil between depths of 8 and

25 inches is moist in some part for less than 90 consecutive days. The particle-size class control section averages 8 to 15 percent clay.

The A horizon has color of 10YR 5/4, 6/3, or 7/3. Moist color is 10YR 4/3, 4/4, 5/3. Reaction is slightly or moderately alkaline.

The Bk and C horizons have dry color of 2.5Y 5/4, 6/2, 7/2; 10YR 6/3 or 7/3. Moist color is 2.5Y 4/2, 4/3, 5/2, 6/2; 10YR 4/3, 4/4, 5/4. Texture is sandy loam, loamy coarse sand or loamy sand. The firm layer is weakly cemented with lime and in some parts silica. The SAR ranges from 2 to 25. Reaction is moderately alkaline in the upper part and moderately or strongly alkaline in the lower part.

Lewkalb Series

The Lewkalb series consists of deep, moderately well drained, sodic soils on alluvial plains and terraces. These soils formed in alluvium weathered mainly from granitic rock. Slopes range from 0 to 5 percent.

Taxonomic Class: coarse-loamy, mixed (calcareous), thermic Haploduridic Torriorthents.

Typical pedon of Lewkalb sand, 0 to 2 percent slopes; about 800 feet west and 2,600 feet north of the southeast corner of section 23, T. 26 S., R. 40 E., Ridgecrest North, California Quadrangle:

Ap – 0 to 12 inches; pale brown (10YR 6/3) sand, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; slightly effervescent, disseminated carbonates; moderately alkaline; abrupt smooth boundary.

C1 – 12 to 28 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; strongly effervescent, disseminated carbonates; moderately alkaline; abrupt smooth boundary.

C2 – 28 to 35 inches; light gray (10YR 7/2) fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; strongly effervescent, disseminated carbonates; strongly alkaline; abrupt smooth boundary.

Ckn – 35 to 38 inches; light brownish gray (2.5Y 6/2) loam, olive (5Y 5/4) moist; weak subangular blocky structure; very hard, friable, slightly sticky and nonplastic; few very fine roots; common very fine interstitial and few very fine tubular pores; violently effervescent, disseminated carbonates; strongly alkaline; abrupt smooth boundary.

Cqn – 38 to 49 inches; pale yellow (5Y 7/3) sandy loam, olive (5Y 5/4) moist; massive; very hard, firm, nonsticky and nonplastic; common very fine interstitial and few very fine tubular pores; strongly effervescent, disseminated carbonates; strongly alkaline; clear smooth boundary.

Ckqmn – 49 to 60 inches; very pale brown (10YR 7/3) fractured hardpan; yellowish brown (10YR 5/4) moist; very hard; very firm; violently effervescent; strongly alkaline.

The soil moisture control section is moist for less than 90 days in most years. Cemented layers occur below a depth of 20 inches. The electrical conductivity (mmhos/cm) is less than 4.

The A horizon has dry color of 10YR 5/3, 6/3, 6/4; or 2.5Y 6/2. Moist color is 10YR 4/3, 4/4; or 2.5Y 4/4. The SAR is 2 to 15, and the reaction is mildly or moderately alkaline.

The C horizons have dry color of 10YR 6/3, 6/4, 7/2, 7/3; 2.5Y 6/2; or 5Y 7/3. Moist color is 10YR 4/3, 4/4, 5/3, 5/4; 2.5Y 4/4; or 5Y 5/4. Texture is loamy sand, sandy loam, fine sandy loam or loam. The SAR ranges from 2 to 50.

Lewkalb is a taxadjunct to the series. As mapped in this area it classifies as a Duridic Torrifluent, coarse-loamy, mixed (calcareous), thermic. It is stratified in the upper part of the profile. This difference does not significantly affect use and management.

Neuralia Series

The Neuralia series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium weathered mainly from granitic rock. Slopes range from 0 to 9 percent.

Taxonomic Class: fine-loamy, mixed thermic Typic Haplargids.

Typical pedon of Neuralia sand, 2 to 5 percent slopes; about 200 feet north and 400 feet east of the southwest corner of section 10 T. 25 S., R. 39 E., Ridgecrest South, California Quadrangle:

A1 – 0 to 14 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; common fine and very fine roots; few very fine interstitial pores; 5 percent gravel; slightly alkaline; gradual smooth boundary.

A2 – 14 to 19 inches; yellowish brown (10YR 5/4) sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; few very fine interstitial pores; 5 percent gravel; moderately alkaline; clear smooth boundary.

BAtk – 19 to 25 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common fine and few very fine roots; common very fine interstitial and few very fine tubular pores; 10 percent gravel; slightly effervescent, carbonates segregated in few fine filaments; moderately alkaline; clear wavy boundary.

Btk1 – 25 to 29 inches; strong brown (7.5YR 4/6) gravelly sandy clay loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; hard, friable, sticky and very plastic; common very fine roots; common very fine tubular and few very few very fine interstitial pores; 30 percent gravel; many moderately thick clay films bridging mineral grains and few moderately thick clay films on peds and in pores; slightly effervescent, carbonates segregated in few fine filaments; moderately alkaline; clear smooth boundary.

Btk2 – 29 to 36 inches; strong brown (7.5YR 4/6) gravelly sandy clay loam, brown (7.5YR 4/4) moist; weak medium angular blocky structure; hard, friable, sticky and plastic; common very fine roots; common very fine interstitial and few very fine tubular pores; 30 percent gravel; many thin clay films in pores and bridging mineral grains; strongly

effervescent, carbonates segregated in many fine filaments; moderately alkaline; gradual smooth boundary.

Bk – 36 to 50 inches; light brown (7.5YR 6/4) gravelly coarse sand, strong brown (7.5YR 5/6) moist; weak coarse subangular blocky structure; hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 34 percent gravel, strongly effervescent, carbonates segregated in common fine seams and coating the underside of gravel; moderately alkaline; clear smooth boundary.

2C – 50 to 60 inches; light brown (7.5YR 6/4) coarse sand, strong brown (7.5YR 4/6) moist; moderate medium and coarse subangular blocky structure; hard, very friable, nonsticky and nonplastic, few very fine roots; few very fine interstitial pores; 13 percent gravel; slightly effervescent, carbonates disseminated; moderately alkaline.

The soil moisture control section is moist for less than 90 days in most years. Reaction is neutral to moderately alkaline in the surface and moderately alkaline below a depth of 10 inches.

The A horizon has dry color of 10YR 5/3, 5/4, 6/3 or 6/4 Moist color is 10YR 4/3, 4/4 or 5/3. It is loamy sand or sand. Gravel content is 0 to 10 percent.

The Bt horizon has dry color of 10YR 5/4; 7.5YR 4/6, 5/4 or 5/6. Moist color is 10YR 4/4; 4/6, 5/4; or 7.5YR 4/4. Texture is sandy loam or gravelly sandy clay loam. Gravel content is 10 to 35 percent. Carbonates are present in at least part of the Bt horizon.

The C horizon has dry color of 10YR 5/4, 5/6, 6/4, 6/6; 7.5YR 5/4 or 6/4. Moist color is 10YR 4/4, 4/6; 7.5YR 4/6, 5/2 or 5/6. It is coarse sand, loamy coarse sand or loamy sand. Some layers are gravelly and some are very cobbly. Rock fragment content is as much as 55 percent of the horizon.

Rosamond Series

The Rosamond series consists of very deep, well drained, saline-sodic soils on lower margins of alluvial fans. These soils formed in alluvium weathered mainly from granitic rock. Slopes range from 0 to 2 percent.

Taxonomic Class: fine-loamy, mixed (calcareous), thermic Typic Torrifluvents.

Typical pedon of Rosamond very fine sandy loam, 0 to 2 percent slopes; about 2200 feet west and 100 feet north of the southeast corner of section 8 T. 30 S., R. 38 E., Cantil California Quadrangle:

A – 0 to 6 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, few fine and few medium roots; common very fine tubular and interstitial pores; slightly effervescent, carbonates disseminated; moderately alkaline; abrupt wavy boundary.

Cnz1 – 6 to 14 inches; light brownish gray (10YR 6/2) silt loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; very hard, firm, sticky and plastic; common very fine, few fine and few medium roots; and few fine tubular, common very fine tubular and few very fine interstitial pores; strongly effervescent, carbonates

segregated in few fine and medium soft masses and few fine concretions; strongly alkaline; abrupt wavy boundary.

Cnz2 – 14 to 21 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few fine and very fine roots; common very fine and few very fine tubular pores; effervescent, carbonates segregated in few fine soft masses and few fine concretions; strongly alkaline; clear wavy boundary.

Cnz3 – 21 to 34 inches; yellowish brown (10YR 5/4) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine, few medium and common very fine roots; common very fine and few fine tubular pores; strongly effervescent, carbonates segregated in few fine soft masses and few medium concretions; moderately alkaline; abrupt smooth boundary.

Cz – 34 to 60 inches; pale brown (10YR 6/3) loam; brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; strongly effervescent, carbonates segregated in few fine soft masses ; moderately alkaline.

The soil moisture control section is moist for less than 90 days in most years. EC ranges from 4 to 32 mmhos/cm.

The A horizon has dry color of 10YR 5/3 or 6/3. Moist color is 10YR 4/3, 4/4 or 5/3. The SAR ranges from 2 to 15.

The C horizon is stratified. The strata have a dry color of 10YR 5/2, 5/3, 5/4, 6/2, 6/3 or 6/4. Moist color is 10YR 4/3, 4/4, 5/3; or 7.5YR 4/4. These layers have a texture ranging from loam to silty clay loam. Average clay content between depths of 10 to 40 inches is 18 to 30 percent. The SAR ranges from 12 to 30.

Sparkhule Series

The Sparkhule series consists of shallow, well drained soils on hills. These soils formed material weathered from granitic and volcanic rocks. Slopes range from 15 to 50 percent.

Taxonomic Class: loamy, mixed, thermic Lithic Haplargids.

A typical pedon of Sparkhule very cobbly sandy loam occurs in an area of Sparkhule-Rock outcrop association, 15 to 50 percent slopes; about 700 feet south and 2,100 feet west of the northeast corner of section 23 T. 27 S., R., 40 E.; Ridgecrest South Quadrangle:

A – 0 to 2 inches; yellowish brown (10YR 5/4) very cobbly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine interstitial pores; 20 percent gravel, 15 percent cobbles, and 4 percent stones; slightly alkaline; clear smooth boundary.

Bt1 – 2 to 8 inches; brown (7.5YR 5/4) gravelly sandy clay loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine roots; many very fine interstitial and few very fine tubular

pores; common moderately thick clay films in pores and on peds; 15 percent gravel and 2 percent cobbles; slightly alkaline; clear smooth boundary.

Bt2 – 8 to 12 inches; brown (7.5YR 4/4) gravelly sandy clay loam, strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; hard, very friable, sticky and slightly plastic; common very fine roots; many very fine interstitial pores; common thin and moderately thick clay films in pores and on peds; 30 percent gravel; slightly alkaline; gradual wavy boundary.

Cr – 12 to 15 inches; brown (7.5YR 4/4) weathered granodiorite rock; few very fine roots in cracks; gradual wavy boundary.

R – 15 inches; fractured granodiorite.

The depth to hard rock is 14 to 20 inches. The soil moisture control section is dry from April to the end of November and is not continuously moist the rest of the year for as long as 60 days.

The A horizon has a dry color of 10YR 5/3 or 5/4 and moist color of 10YR 3/3, 3/4, or 4/4. It averages 10 to 15 percent clay and 35 to 50 percent rock fragments.

The Bt horizon has a dry color of 7.5YR 4/4, 5/4 or 6/6 and moist color of 7.5YR 4/4, 4/6, 6/6; or 5YR 4/6. It is gravelly sandy clay loam with 25 to 35 percent clay.

References

1. Adams, F. 1984. Soil acidity and liming. Am. Soc. Agron., Agron. Monogr. 12, 2d ed.
2. American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.
3. American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.
4. Birkeland, Peter W. 1974. Pedology, weathering, and geomorphological research.
5. Birkeland, Peter W. 1984. Soils and geomorphology. 2d ed.
6. Black, C.A. 1968. Soil-plant relationships. 2d ed.
7. Buol, S.W., F.D. Hole, and R.J. McCracken. 1980. Soil genesis and classification. 3d ed.
8. Coleman, Steven M. 1981. Rock-weathering rates as functions of time. Quant. Res. 15: 250-264.
9. Jenny, Hans. 1941. Factors of soil formation.
10. Jenny, Hans. 1980. The soil resource; Origin and behavior. Ecol. Stud., vol. 37.
11. Miller, Fred P., Donald E. McCormack, and James R. Talbot. 1979. Soil surveys: Review of data-collection methodologies, confidence limits, and uses. Natl. Acad. Sci. Transp. Res. Board, Transp. Res. Rec. 733: 57-65.
12. Mokma, D.L. 1978. Soil management units and land use planning. Mich. State Univ., Ext. Bull. E-1262.
13. Naval Air Weapons Center, China Lake. Technical Memorandum 4158, The Weather at NWC.
14. Portland Cement Association. 1973. PCA soil primer.
15. Ruhe, Robert V. 1956. Geomorphic surfaces and the nature of soils. Soil Sci. 82: 441-455.
16. Simonson, Roy W. 1959. Outline of a generalized theory of soil genesis. Soil Sci. Soc. Am. Proc. 23: 152-156.
17. Stevenson, F.J. 1982. Humus chemistry: Genesis, composition, reactions.

18. Stevenson, F.J., ed. 1982. Nitrogen in agricultural soils. Am. Soc. Agron., Agron. Monogr. 22.
19. Thornbury, William D. 1969. Principles of geomorphology. 2d ed.
20. United States Department of Agriculture, Soil Conservation Service. National engineering handbook. (Available in the State Office of the Natural Resources Conservation Service at Davis, California)
21. United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook. Soil Surv. Staff.
22. United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210.
23. United States Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. U.S. Dep. Agric. Handb. 436.
24. United States Department of Agriculture, Soil Conservation Service. 1981. Land resource regions and major land resource areas of the United States. U.S. Dep. Agric. Handb. 296.
25. United States Department of Agriculture, Soil Conservation Service. 1987. Basic statistics, 1982 national resources inventory. Stat. Bull. 756.
26. United States Department of Agriculture, Soil Conservation Service. 1991. Soil survey laboratory methods manual. Soil Surv. Invest. Rep. 42.
27. United States Department of Agriculture, Soil Conservation Service. 1992. Keys to soil taxonomy. 5th ed. Soil Surv. Staff, Soil Manage. Support Serv. Tech. Monogr. 19.
28. United States Department of Agriculture, Soil Conservation Service. 1993. Soil survey manual. Soil Surv. Staff, U.S. Dep. Agric. Handb. 18.
29. United States Department of the Interior, Geological Survey. Geologic map of California - Bakersfield Sheet and Trona Sheet.
30. Walsh, L.M., and J.D. Beaton, eds. 1973. Soil testing and plant analysis. Soil Sci. Soc. Am.

Glossary

- Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.
- Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.
- Alkali (sodic) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.
- Alluvial fan.** The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.
- Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.
- Animal unit month (AUM).** The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.
- Aquic conditions.** Current soil wetness characterized by saturation, reduction, and redoximorphic features.
- Area reclaim (in tables).** An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.
- Argillic horizon.** A subsoil horizon characterized by an accumulation of illuvial clay.
- Aspect.** The direction in which a slope faces.
- Association, soil.** A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.
- Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:
- | | |
|-----------------|--------------|
| Very low | 0 to 2.5 |
| Low..... | 2.5 to 5 |
| Moderate..... | 5 to 7.5 |
| High..... | 7.5 to 10 |
| Very high | more than 10 |
- Back slope.** The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.
- Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.
- Bedding system.** A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.
- Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.
- 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.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds directly beneath the solum, or it is exposed at the surface by erosion.

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.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay 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.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane that typically takes the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

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.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. *Very deep* soils are more than 60 inches deep over bedrock; *deep* soils, 40 to 60 inches; *moderately deep*, 20 to 40 inches; *shallow*, 10 to 20 inches; and *very shallow*, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. On a desert surface, a layer of gravel or larger fragments that was emplaced by upward movement of the underlying sediments or that remains after finer particles have been removed by running water or the wind.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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.

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.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

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.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

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.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

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 (7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

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.

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. natural elevation of the land surface, rising less than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides.

Horizon, soil. layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.- An organic layer of fresh and decaying plant residue.

A horizon.- The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.- The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.- The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.- The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that

in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.- Soft, consolidated bedrock beneath the soil.

R layer.-Consolidated bedrock beneath the soil: The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

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.

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 flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

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.

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.

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.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

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.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance-*few*, *common*, and *many*; size-*fine*, *medium*, and *coarse*; and contrast-*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2

inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

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.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percolates slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and flooding.

- pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)
- Piping** (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.
- Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.
- Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.
- Playa.** The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.
- Plowpan.** compacted layer formed in the soil directly below the plowed layer.
- Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.
- Poor filter** (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.
- Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.
- Poor outlets** (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.
- Potential native plant community.** See Climax plant community.
- Potential rooting depth (effective rooting depth).** Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.
- 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.
- 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 has departed from the potential.
- Rangeland.** Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.
- 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 or proportion of species or total production.
- Reaction, soil.** 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 alkaline9.1 and higher

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

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.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

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.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

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 $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Sodicity	SAR
Slight.....	less than 13:1
Moderate.....	13-30:1
Strong.....	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand.....	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand.....	0.5 to 0.25
Fine sand.....	0.25 to 0.10
Very fine sand.....	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each

grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

TABLE A.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
102	Cajon gravelly loamy sand, 0 to 2 percent slopes-----	4,935	7.0
104	Cajon sand, 0 to 5 percent slopes, occasionally flooded-----	1,715	2.4
105	Cajon sand, 0 to 2 percent slopes-----	14,215	20.1
106	Cajon sand, 2 to 5 percent slopes-----	3,815	5.4
108	Cajon gravelly sand, 2 to 5 percent slopes-----	7,900	11.1
109	Cajon sandy loam, 0 to 2 percent slopes, occasionally flooded-----	3,355	4.7
111	Neuralia loamy sand, 0 to 2 percent slopes-----	1,770	2.5
112	Neuralia sand, 2 to 5 percent slopes-----	3,020	4.3
113	Neuralia sand, 5 to 9 percent slopes-----	210	0.3
114	Neuralia-Urban land complex, 0 to 5 percent slopes-----	150	0.2
116	Helendale sand, 0 to 2 percent slopes-----	7,675	10.8
117	Helendale sand, 2 to 5 percent slopes-----	2,580	3.6
118	Helendale-Urban land complex, 0 to 2 percent slopes-----	1,185	1.7
121	Garlock coarse sand, 0 to 2 percent slopes-----	1,005	1.4
122	Garlock coarse sand, 2 to 5 percent slopes-----	2,370	3.3
130	Lavic sand, 0 to 2 percent slopes-----	745	1.1
131	Lavic-Urban land complex, 0 to 5 percent slopes-----	65	0.1
135	Arizo very cobbly coarse sand, 2 to 9 percent slopes, occasionally flooded-----	1,430	2.0
140	Playas-----	315	0.4
150	Pits-----	30	*
155	Helendale loamy sand, 0 to 2 percent slopes-----	1,995	2.8
156	Helendale loamy sand, 2 to 5 percent slopes-----	850	1.2
159	Garlock complex, 2 to 5 percent slopes-----	470	0.7
161	Cajon sand, channeled, 2 to 9 percent slopes, occasionally flooded-----	240	0.3
162	Cajon-Helendale complex, 2 to 15 percent slopes-----	425	0.6
165	Rosamond very fine sandy loam, 0 to 2 percent slopes-----	410	0.6
170	Neuralia loamy sand, cobbly substratum, 0 to 5 percent slopes-----	2,690	3.8
175	Water, disposal ponds-----	35	*
180	Cerrocoso gravelly sandy loam, 0 to 2 percent slopes-----	1,040	1.5
181	Cerrocoso gravelly sandy loam, 2 to 5 percent slopes-----	1,965	2.8
182	Cerrocoso-Urban land complex, 0 to 5 percent slopes-----	700	1.0
190	Sparkhule-Rock outcrop association, 15 to 50 percent slopes-----	430	0.6
200	Urban land-----	385	0.5
211	Lewkalb sand, 0 to 2 percent slopes-----	295	0.4
221	Alko loamy coarse sand, 0 to 2 percent slopes-----	240	0.3
291	Cajon-Urban land complex, 0 to 5 percent slopes-----	105	0.1
292	Lewkalb-Urban land complex, 0 to 5 percent slopes-----	100	0.1
	Total-----	70,860	100.0

* Less than 0.1 percent.

TABLE B.--LAND CAPABILITY CLASSES AND YIELDS
PER ACRE OF CROPS AND PASTURE

(Yields in the N columns are for nonirrigated soils; those in the I columns are for irrigated soils. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability		Alfalfa hay		Barley	
	N	I	N	I	N	I
			Tons	Tons	Bu	Bu
102----- Cajon	VIIe	IVs	---	6	---	50
104----- Cajon	VIIw	---	---	---	---	---
105, 106----- Cajon	VIIe	IIIIs	---	6	---	60
108----- Cajon	VIIe	IVs	---	6	---	50
109----- Cajon	VIIw	---	---	---	---	---
111, 112, 113- Neuralia	VIIe	---	---	---	---	---
114*: Neuralia----	VIIe	---	---	---	---	---
Urban land---	VIII	---	---	---	---	---
116, 117----- Helendale	VIIe	IIIIs	---	7	---	70
118*: Helendale----	VIIe	---	---	---	---	---
Urban land---	VIII	---	---	---	---	---
121, 122----- Garlock	VIIe	---	---	---	---	---

See footnote at end of table.

TABLE B.--LAND CAPABILITY CLASSES AND YIELDS
PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Alfalfa hay		Barley	
	N	I	N	I	N	I
			Tons	Tons	Bu	Bu
			—	—	—	—
130----- Lavic	VIIe	---	---	---	---	---
131*: Lavic-----	VIIe	---	---	---	---	---
Urban land---	VIII	---	---	---	---	---
135----- Arizo	VIIw	---	---	---	---	---
140*----- Playas	VIII	---	---	---	---	---
150*----- Pits	VIII	---	---	---	---	---
155----- Helendale	VIIe	IIIs	---	7	---	70
156----- Helendale	VIIe	---	---	---	---	---
159: Garlock-----	VIIe	---	---	---	---	---
Garlock, hard substratum--	VIIe	---	---	---	---	---
161----- Cajon	VIIw	---	---	---	---	---
162: Cajon-----	VIIe	---	---	---	---	---
Helendale---	VIIe	---	---	---	---	---
165----- Rosamond	VIIIs	---	---	---	---	---

See footnote at end of table.

TABLE B.--LAND CAPABILITY CLASSES AND YIELDS
PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Alfalfa hay		Barley	
	N	I	N	I	N	I
			Tons	Tons	Bu	Bu
170----- Neuralia	VIle	---	---	---	---	---
175* Water						
180, 181----- Cerrocoso	VIle	---	---	---	---	---
182*: Cerrocoso----	VIle	---	---	---	---	---
Urban land---	VIII	---	---	---	---	---
190*: Sparkhule----	VIle	---	---	---	---	---
Rock outcrop-	VIII	---	---	---	---	---
200*----- Urban land	VIII	---	---	---	---	---
211----- Lewkalb	VIle	---	---	---	---	---
221----- Alko	VIIIs	---	---	---	---	---
291*: Cajon-----	VIle	---	---	---	---	---
Urban land---	VIII	---	---	---	---	---
292*: Lewkalb-----	VIle	---	---	---	---	---
Urban land---	VIII	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE C.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

(Only the soils that support rangeland vegetation suitable for grazing are listed)

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
102----- Cajon	Favorable	200	Creosotebush-----	25
	Normal	100	Allscale saltbush-----	15
	Unfavorable	50	White bursage-----	10
			Mediterranean schismus-----	10
			Filaree-----	10
			Shadscale-----	10
			Indian ricegrass-----	5
			Red brome-----	5
104----- Cajon	Favorable	200	Allscale saltbush-----	20
	Normal	150	Red brome-----	20
	Unfavorable	100	Burrobush-----	20
			Creosotebush-----	10
			Filaree-----	10
			White bursage-----	5
105----- Cajon	Favorable	250	Creosotebush-----	25
	Normal	150	Allscale saltbush-----	15
	Unfavorable	100	White bursage-----	10
			Mediterranean schismus-----	10
			Filaree-----	10
			Shadscale-----	10
			Indian ricegrass-----	5
			Red brome-----	5
106----- Cajon	Favorable	250	Creosotebush-----	25
	Normal	150	Allscale saltbush-----	15
	Unfavorable	100	White bursage-----	10
			Mediterranean schismus-----	10
			Filaree-----	10
			Shadscale-----	10
			Indian ricegrass-----	5
			Red brome-----	5
108----- Cajon	Favorable	200	Creosotebush-----	25
	Normal	100	Allscale saltbush-----	15
	Unfavorable	50	White bursage-----	10
			Mediterranean schismus-----	10
			Filaree-----	10
			Shadscale-----	10
			Indian ricegrass-----	5
			Red brome-----	5

TABLE C.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
109----- Cajon	Favorable	300	Allscale saltbush-----	20
	Normal	250	Creosotebush-----	20
	Unfavorable	175	White bursage-----	10
			Shadscale-----	10
			Filaree-----	5
			Iodinebush-----	5
			Schismus-----	5
111----- Neuralia	Favorable	200	Creosotebush-----	40
	Normal	150	White bursage-----	20
	Unfavorable	100	Allscale saltbush-----	15
			Schismus-----	5
			Filaree-----	5
112, 113----- Neuralia	Favorable	250	Creosotebush-----	40
	Normal	200	White bursage-----	15
	Unfavorable	150	Allscale saltbush-----	10
			Filaree-----	10
			Red brome-----	5
116, 117----- Helendale	Favorable	400	Creosotebush-----	40
	Normal	200	White bursage-----	20
	Unfavorable	100	Indian ricegrass-----	10
			Filaree-----	5
			Cactus-----	5
121, 122----- Garlock	Favorable	300	White bursage-----	35
	Normal	250	Creosotebush-----	25
	Unfavorable	175	Allscale saltbush-----	20
			Indian ricegrass-----	5
			Filaree-----	5
130----- Lavic	Favorable	300	Creosotebush-----	40
	Normal	200	White bursage-----	20
	Unfavorable	150	Allscale saltbush-----	20
			Shadscale-----	5
			Filaree-----	5
135----- Arizo	Favorable	250	Creosotebush-----	60
	Normal	125	White bursage-----	10
	Unfavorable	75	Filaree-----	5
			Allscale saltbush-----	5

See footnote at end of table.

TABLE C.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
155, 156-----	Favorable	400	Creosotebush-----	40
Helendale	Normal	200	White bursage-----	20
	Unfavorable	100	Indian ricegrass-----	10
			Filaree-----	5
			Cactus-----	5
			Schismus-----	5
159*:				
Garlock-----	Favorable	300	White bursage-----	35
	Normal	250	Creosotebush-----	25
	Unfavorable	175	Allscale saltbush-----	20
			Indian ricegrass-----	5
			Filaree-----	5
Garlock, hard substratum-----	Favorable	250	White bursage-----	40
	Normal	200	Creosotebush-----	30
	Unfavorable	150	Filaree-----	5
			Schismus-----	5
			Red brome-----	5
			Allscale saltbush-----	5
161-----	Favorable	200	Creosotebush-----	60
Cajon	Normal	150	White bursage-----	15
	Unfavorable	100	Allscale saltbush-----	5
			Filaree-----	5
162*:				
Cajon-----	Favorable	250	Creosotebush-----	40
	Normal	150	Burrobush-----	20
	Unfavorable	100	Filaree-----	10
			Mediterranean schismus-----	5
			Indian ricegrass-----	5
			Red brome-----	5
Helendale-----	Favorable	400	Creosotebush-----	40
	Normal	200	White bursage-----	20
	Unfavorable	100	Indian ricegrass-----	10
			Filaree-----	5
			Cactus-----	5
			Schismus-----	5

See footnote at end of table.

TABLE C.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
165----- Rosamond	Favorable	700	Shadscale-----	30
	Normal	400	Allscale saltbush-----	10
	Unfavorable	250	Desert alysum-----	10
			Iodinebush-----	5
			Filaree-----	5
			Brome-----	5
			Schismus-----	5
170----- Neuralia	Favorable	250	Creosotebush-----	45
	Normal	150	White bursage-----	20
	Unfavorable	100	Allscale saltbush-----	10
			Schismus-----	5
			Filaree-----	5
180, 181----- Cerrocoso	Favorable	350	Creosotebush-----	35
	Normal	200	Filaree-----	20
	Unfavorable	100	White bursage-----	10
			Allscale saltbush-----	10
			Schismus-----	5
			Cactus-----	5
190*: Sparkhule-----	Favorable	200	Creosotebush-----	50
	Normal	350	Filaree-----	20
	Unfavorable	450	White bursage-----	10
			California buckwheat-----	5
			Red brome-----	5
Rock outcrop.				
211----- Lewkalb	Favorable	300	Allscale saltbush-----	60
	Normal	250	Shadscale-----	15
	Unfavorable	200	Creosotebush-----	5
			Schismus-----	5
221----- Alko	Favorable	275	Saltbush-----	25
	Normal	200	Filaree-----	15
	Unfavorable	125	White bursage-----	15
			Shadscale-----	15
			Creosotebush-----	10
			Mediterranean schismus-----	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE G.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
102----- Cajon	Severe: flooding.	Moderate: too sandy, small stones.	Severe: small stones.	Moderate: too sandy.	Severe: droughty.
104----- Cajon	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
105----- Cajon	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
106----- Cajon	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
108----- Cajon	Severe: too sandy.	Severe: too sandy.	Severe: small stones, too sandy.	Severe: too sandy.	Severe: droughty.
109----- Cajon	Severe: flooding.	Slight-----	Slight-----	Slight-----	Moderate: droughty, flooding.
111----- Neuralia	Severe: flooding.	Slight-----	Moderate: small stones.	Slight-----	Moderate: droughty.
112, 113----- Neuralia	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
114*: Neuralia-----	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Moderate: droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

See footnote at end of table.

TABLE G.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
116----- Helendale	Severe: flooding, too sandy.	Severe: too sandy.	Moderate: small stones.	Severe: too sandy.	Moderate: droughty.
117----- Helendale	Severe: too sandy.	Severe: too sandy.	Moderate: slope, small stones.	Severe: too sandy.	Moderate: droughty.
118*: Helendale-----	Severe: flooding, too sandy.	Severe: too sandy.	Moderate: small stones.	Severe: too sandy.	Moderate: droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
121----- Garlock	Severe: flooding, too sandy.	Severe: too sandy.	Moderate: small stones.	Severe: too sandy.	Severe: too sandy.
122----- Garlock	Severe: too sandy.	Severe: too sandy.	Moderate: slope, small stones.	Severe: too sandy.	Severe: too sandy.
130----- Lavic	Severe: flooding, too sandy.	Severe: too sandy.	Moderate: slope, small stones.	Severe: too sandy.	Moderate: droughty, too sandy.
131*: Lavic-----	Severe: flooding, too sandy.	Severe: too sandy.	Moderate: slope, small stones.	Severe: too sandy.	Moderate: droughty, too sandy.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
135----- Arizo	Severe: flooding, large stones, too sandy.	Severe: large stones, too sandy.	Severe: large stones, small stones.	Severe: too sandy.	Severe: large stones, droughty, too sandy.
140*----- Playas	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess salt.	Severe: too clayey, ponding.	Severe: ponding, too clayey, erodes easily.	Severe: excess salt, ponding, droughty.

See footnote at end of table.

TABLE G.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
150*----- Pits	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
155----- Helendale	Severe: flooding.	Slight-----	Moderate: small stones.	Slight-----	Moderate: droughty.
156----- Helendale	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Moderate: droughty.
159*: Garlock-----	Severe: flooding, too sandy.	Severe: too sandy.	Moderate: slope, small stones.	Severe: too sandy.	Severe: too sandy.
Garlock, hard substratum-----	Severe: flooding, too sandy.	Slight-----	Moderate: slope, small stones.	Severe: too sandy.	Severe: too sandy.
161----- Cajon	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
162*: Cajon-----	Moderate: too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
Helendale-----	Slight-----	Slight-----	Severe: small stones.	Slight-----	Moderate: small stones, droughty.
165----- Rosamond	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Moderate: dusty.	Severe: excess salt, excess sodium.
170----- Neuralia	Severe: flooding.	Slight-----	Moderate: small stones.	Slight-----	Moderate: droughty.

See footnote at end of table.

TABLE G.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
175*. Water					
180----- Cerrocoso	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: small stones, excess sodium.	Slight-----	Severe: excess sodium.
181----- Cerrocoso	Severe: excess sodium.	Severe: excess sodium.	Severe: small stones, excess sodium.	Slight-----	Severe: excess sodium.
182*: Cerrocoso-----	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Slight-----	Severe: excess sodium.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
190*: Sparkhule-----	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope, depth to rock.
Rock outcrop-----	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
200*----- Urban land	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
211----- Lewkalb	Severe: flooding, too sandy, excess sodium.	Severe: too sandy, excess sodium.	Severe: too sandy, excess sodium.	Severe: too sandy.	Severe: excess sodium.
221----- Alko	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Moderate: too sandy.	Severe: cemented pan.
291*: Cajon-----	Severe: flooding.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

See footnote at end of table.

TABLE G.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
292*: Lewkalb-----	Severe: flooding, too sandy, excess sodium.	Severe: too sandy, excess sodium.	Severe: too sandy, excess sodium.	Severe: too sandy.	Severe: excess sodium.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE H.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number:				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
102----- Cajon	0-6	Gravelly loamy sand.	SM, GM	A-1	0	55-80	50-75	25-50	10-20	---	NP
	6-60	Gravelly loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM, GM	A-1	0	55-80	50-75	25-50	10-20	---	NP
104----- Cajon	0-14	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	85-100	75-100	40-60	5-25	---	NP
	14-25	Loamy coarse sand, loamy sand.	SM	A-1, A-2	0	85-100	80-100	40-70	10-30	---	NP
	25-60	Stratified gravelly coarse sand to loamy sand.	SM, SP-SM	A-1, A-2, A-3	0-10	65-95	55-90	30-60	5-20	---	NP
105----- Cajon	0-7	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	95-100	75-100	40-60	5-25	---	NP
	7-25	Sand, fine sand	SM, SP-SM	A-1, A-2, A-3	0	95-100	75-100	40-60	5-25	---	NP
	25-55	Loamy sand, loamy fine sand, loamy coarse sand.	SM	A-2	0	95-100	75-100	50-80	10-30	---	NP
	55-60	Gravelly sand, gravelly loamy sand.	SM, SP-SM	A-1	0	60-85	50-75	25-50	5-20	---	NP
106----- Cajon	0-10	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	95-100	75-100	40-60	5-25	---	NP
	10-48	Loamy sand, loamy fine sand, loamy coarse sand.	SM	A-2	0	95-100	75-100	50-80	10-30	---	NP
	48-60	Gravelly sand, gravelly loamy sand.	SM, SP-SM	A-1	0	60-85	50-75	25-50	5-20	---	NP

TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number:				Liquid Limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
108----- Cajon	0-4	Gravelly sand----	SM, SP-SM	A-1, A-2, A-3	0	55-80	50-75	25-55	5-25	---	NP
	4-60	Gravelly loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM, GM	A-1	0	55-80	50-75	25-50	10-20	---	NP
109----- Cajon	0-2	Sandy loam-----	SM	A-2, A-4	0	90-100	85-100	50-70	30-40	20-30	NP-5
	2-30	Loamy coarse sand, loamy sand.	SM	A-1, A-2	0	85-100	80-100	40-70	10-30	---	NP
	30-60	Stratified gravelly coarse sand to loamy sand.	SM, SP-SM	A-1, A-2, A-3	0-10	65-95	55-90	30-60	5-20	---	NP
111----- Neuralia	0-15	Loamy sand-----	SM	A-1, A-2	0	90-100	85-100	40-75	15-30	---	NP
	15-33	Sandy loam, sandy clay loam, gravelly sandy clay loam.	SC-SM, SC, GM-GC, GC	A-2, A-4, A-6	0-10	55-90	50-85	40-70	20-45	25-35	5-15
	33-60	Stratified gravelly coarse sand to loamy sand.	GM, SM	A-1	0-5	55-95	50-90	30-50	10-25	---	NP
112----- Neuralia	0-19	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	90-100	85-100	40-65	5-15	---	NP
	19-36	Sandy loam, sandy clay loam, gravelly sandy clay loam.	SC-SM, SC, GM-GC, GC	A-2, A-4, A-6	0-10	55-90	50-85	40-70	20-45	25-35	5-15
	36-60	Stratified gravelly coarse sand to loamy sand.	GM, SM	A-1	0-5	55-95	50-90	30-50	10-25	---	NP

TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number:				Liquid limit	Plas- ticity index
			Unified	AASHTO							
						4	10	40	200		
	<u>In</u>				<u>Pct</u>					<u>Pct</u>	
113----- Neuralia	0-12	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	90-100	85-100	40-65	5-15	---	NP
	12-39	Sandy loam, sandy clay loam, gravelly sandy clay loam.	SC-SM, SC, GM-GC, GC	A-2, A-4, A-6	0-10	55-90	50-85	40-70	20-45	25-35	5-15
	39-60	Stratified gravelly coarse sand to loamy sand.	GM, SM	A-1	0-5	55-95	50-90	30-50	10-25	---	NP
114*:											
Neuralia-----	0-15	Loamy sand-----	SM	A-1, A-2	0	90-100	85-100	40-75	15-30	---	NP
	15-33	Sandy loam, sandy clay loam, gravelly sandy clay loam.	SC-SM, SC, GM-GC, GC	A-2, A-4, A-6	0-10	55-90	50-85	40-70	20-45	25-35	5-15
	33-60	Stratified gravelly coarse sand to loamy sand.	GM, SM	A-1	0-5	55-95	50-90	30-50	10-25	---	NP
Urban land-----	0-6	Variable-----	---	---	---	---	---	---	---	---	---
116, 117----- Helendale	0-12	Sand-----	SP-SM, SM	A-1, A-2, A-3	0	80-100	75-95	40-65	5-15	---	NP
	12-43	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	80-100	75-95	50-70	25-40	20-30	NP-5
	43-48	Loamy coarse sand, loamy sand.	SM	A-1, A-2	0	80-100	75-95	35-65	10-25	---	NP
	48-60	Very gravelly coarse sand, gravelly coarse sand, gravelly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	0-10	50-80	45-75	25-50	5-15	---	NP

See footnote at end of table.

TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number:				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
118*: Helendale-----	0-12	Sand-----	SP-SM, SM	A-1, A-2, A-3	0	80-100	75-95	40-65	5-15	---	NP
	12-43	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	80-100	75-95	50-70	25-40	20-30	NP-5
	43-48	Loamy coarse sand, loamy sand.	SM	A-1, A-2	0	80-100	75-95	35-65	10-25	---	NP
	48-60	Very gravelly coarse sand, gravelly coarse sand, gravelly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	0-10	50-80	45-75	25-50	5-15	---	NP
Urban land-----	0-6	Variable-----	---	---	---	---	---	---	---	---	---
121, 122----- Garlock	0-4	Coarse sand-----	SM, SP-SM	A-1	0-5	80-100	75-100	30-50	5-15	---	NP
	4-13	Sandy loam-----	SM	A-4	0-5	80-100	75-100	50-70	35-50	20-30	NP-5
	13-39	Sandy clay loam	SC	A-6	0-5	80-100	75-100	60-85	35-50	25-35	10-20
	39-60	Gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1	0-10	55-80	50-75	25-45	5-20	---	NP
130----- Lavic	0-5	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	85-100	85-100	40-60	5-15	---	NP
	5-32	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	85-100	75-100	40-70	15-35	20-30	NP-5
	32-60	Stratified loamy coarse sand to sandy loam.	SM	A-1, A-2	0-5	80-100	75-90	35-65	15-35	20-30	NP-5
131*: Lavic-----	0-5	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	85-100	85-100	40-60	5-15	---	NP
	5-32	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	85-100	75-100	40-70	15-35	20-30	NP-5
	32-60	Stratified loamy coarse sand to sandy loam.	SM	A-1, A-2	0-5	80-100	75-90	35-65	15-35	20-30	NP-5
Urban land-----	0-6	Variable-----	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number:				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
135----- Arizo	0-8	Very cobbly coarse sand.	SM, SP-SM	A-1	25-40	60-75	50-70	15-35	5-15	---	NP
	8-60	Stratified gravelly loamy sand to very gravelly coarse sand.	SM, SP-SM	A-1	5-20	60-80	40-60	25-45	5-20	---	NP
140*----- Playas	0-6	Clay-----	CL, CH, MH	A-7	0	100	100	100	90-100	45-75	20-40
	6-60	Silty clay loam, clay, silty clay.	CL, CH, MH	A-7	0	100	100	100	90-100	45-75	20-40
150*----- Pits	0-60	Variable-----	---	---	---	---	---	---	---	---	---
155, 156----- Helendale	0-4	Loamy sand-----	SM	A-1, A-2	0-5	80-100	75-95	40-65	15-25	---	NP
	4-27	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	80-100	75-95	50-70	25-40	20-30	NP-5
	27-60	Very gravelly coarse sand, gravelly coarse sand, gravelly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	0-10	50-80	45-75	25-50	5-15	---	NP
159*: Garlock-----	0-10	Coarse sand-----	SM, SP-SM	A-1	0-5	80-100	75-100	30-50	5-15	---	NP
	10-26	Sandy loam-----	SM	A-4	0-5	80-100	75-100	50-70	35-50	20-30	NP-5
	26-33	Sandy clay loam	SC	A-6	0-5	80-100	75-100	60-85	35-50	25-35	10-20
	33-60	Gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1	0-10	55-80	50-75	25-45	5-20	---	NP
Garlock, hard substratum-----	0-8	Coarse sand-----	SP-SM, SM	A-1	0-5	80-100	75-100	35-50	5-15	---	NP
	8-29	Sandy loam, sandy clay loam.	SC-SM, SC	A-4, A-6	0-5	80-100	75-100	55-85	35-50	25-40	5-20
	29-36	Gravelly sandy clay loam.	SC, GC	A-2	0-5	55-80	50-75	40-60	25-35	25-35	10-20
	36-50	Gravelly loamy coarse sand.	SM, GM	A-1	0-10	55-80	50-75	25-50	10-20	---	NP
	50-60	Cemented-----	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number:				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
161----- Cajon	0-3	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	85-100	75-100	40-60	5-25	---	NP
	3-7	Loamy coarse sand, loamy sand.	SM	A-1, A-2	0	85-100	80-100	40-70	10-30	---	NP
	7-60	Stratified gravelly coarse sand to loamy sand.	SM, SP-SM	A-1, A-2, A-3	0-10	65-95	55-90	30-60	5-20	---	NP
162*: Cajon-----	0-10	Loamy sand-----	SM	A-2	0	95-100	75-100	50-80	10-30	---	NP
	10-55	Loamy sand, loamy fine sand, loamy coarse sand.	SM	A-2	0	95-100	75-100	50-80	10-30	---	NP
	55-60	Gravelly sand, gravelly loamy sand.	SM, SP-SM	A-1	0	60-85	50-75	25-50	5-20	---	NP
Helendale-----	0-6	Gravelly loamy sand.	SM	A-1	0-5	60-80	55-75	30-50	10-20	---	NP
	6-26	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	80-100	75-95	50-70	25-40	20-30	NP-5
	26-60	Very gravelly coarse sand, gravelly coarse sand, gravelly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	0-10	50-80	45-75	25-50	5-15	---	NP
165----- Rosamond	0-6	Very fine sandy loam.	SM	A-4	0	100	100	70-90	35-50	20-30	NP-5
	6-60	Stratified loam to silty clay loam.	CL	A-6	0	100	95-100	85-100	60-85	25-40	10-20
170----- Neuralia	0-6	Loamy sand-----	SM	A-2	0-5	85-100	80-100	50-60	15-30	---	NP
	6-33	Sandy loam, sandy clay loam.	SC	A-6	0-5	80-100	75-100	50-80	35-50	25-35	10-15
	33-45	Gravelly loamy coarse sand.	SM, GM	A-1	0-10	55-80	50-75	25-50	10-25	---	NP
	45-60	Very cobbly loamy coarse sand.	SM, GM, SP-SM	A-1	25-50	50-65	45-65	20-35	10-15	---	NP

See footnote at end of table.

TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number:				Liquid limit	Plas- ticity index
			Unified	AASHTO							
						4	10	40	200		
	In				Pct					Pct	
175* Water											
180, 181----- Cerrocoso	0-3	Gravelly sandy loam.	SM, GM	A-2	0-5	60-80	55-75	45-60	25-35	20-30	NP-5
	3-21	Sandy clay loam, sandy clay.	SC	A-6, A-7	0-5	80-100	75-95	60-85	35-50	30-45	10-20
	21-27	Coarse sandy loam	SM	A-2	0-10	80-100	75-95	45-65	25-35	20-30	NP-5
	27-60	Stratified very gravelly coarse sand to loamy sand.	SP, SP-SM, GP, GP-GM	A-1	0-15	50-90	45-85	25-50	0-10	---	NP
182*: Cerrocoso-----	0-12	Loamy sand-----	SM	A-1, A-2	0-5	80-100	75-95	40-70	15-25	---	NP
	12-32	Sandy clay loam, sandy clay.	SC	A-6, A-7	0-5	80-100	75-95	60-85	35-50	30-45	10-20
	32-36	Coarse sandy loam	SM	A-2	0-10	80-100	75-95	45-65	25-35	20-30	NP-5
	36-60	Stratified very gravelly coarse sand to loamy sand.	SP, SP-SM, GP, GP-GM	A-1	0-15	50-90	45-85	25-50	0-10	---	NP
Urban land-----	0-6	Variable-----	---	---	---	---	---	---	---	---	---
190*: Sparkhule-----	0-2	Very cobbly sandy loam.	SM	A-2, A-1	15-35	70-85	65-80	40-65	20-30	20-30	NP-5
	2-12	Gravelly sandy clay loam, gravelly clay loam, sandy clay loam.	SC	A-2, A-6	0-10	75-90	55-85	50-75	30-50	30-40	10-20
	12-16	Weathered bedrock	---	---	---	---	---	---	---	---	---
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
200*----- Urban land	0-6	Variable-----	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number:				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
211----- Lewkalb	0-12	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	90-100	85-100	40-80	5-20	---	NP
	12-28	Loamy sand-----	SM	A-1, A-2	0	90-100	85-100	45-80	15-30	---	NP
	28-49	Stratified sandy loam to loam.	SM, ML	A-4	0	95-100	90-100	60-90	35-60	20-35	NP-10
	49-60	Cemented-----	---	---	---	---	---	---	---	---	---
221----- Alko	0-1	Loamy coarse sand	SM	A-1, A-2	0	90-100	75-100	40-70	20-30	---	NP
	1-15	Sandy loam, coarse sandy loam.	SM	A-1, A-2	0	80-100	75-100	35-50	15-30	20-30	NP-5
	15-28	Indurated-----	---	---	---	---	---	---	---	---	---
	28-60	Loamy coarse sand, coarse sandy loam.	SM	A-1, A-2	0	90-100	75-95	40-65	15-30	15-25	NP-5
291*: Cajon-----	0-10	Loamy sand-----	SM	A-2	0	95-100	75-100	50-80	10-30	---	NP
	10-51	Loamy sand, loamy fine sand, loamy coarse sand.	SM	A-2	0	95-100	75-100	50-80	10-30	---	NP
	51-56	Gravelly sand, gravelly loamy sand.	SM, SP-SM	A-1	0	60-85	50-75	25-50	5-20	---	NP
	56-60	Stratified sand to loamy fine sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	75-100	40-60	5-25	---	NP
Urban land-----	0-6	Variable-----	---	---	---	---	---	---	---	---	---
292*: Lewkalb-----	0-12	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	90-100	85-100	40-80	5-20	---	NP
	12-28	Loamy sand-----	SM	A-1, A-2	0	90-100	85-100	45-80	15-30	---	NP
	28-49	Stratified sandy loam to loam.	SM, ML	A-4	0	95-100	90-100	60-90	35-60	20-35	NP-10
	49-60	Cemented-----	---	---	---	---	---	---	---	---	---
Urban land-----	0-6	Variable-----	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE J.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm		K	T		Pct
102----- Cajon	0-6	0-8	1.60-1.70	6.0-20	0.04-0.07	7.4-8.4	0-0	Low-----	0.10	5	3	.5-1
	6-60	0-8	1.60-1.70	6.0-20	0.04-0.07	7.4-8.4	0-0	Low-----	0.10			
104----- Cajon	0-14	0-8	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	0-2	Low-----	0.15	5	1	0-.5
	14-25	3-12	1.60-1.70	6.0-20	0.05-0.07	7.9-8.4	0-2	Low-----	0.15			
	25-60	2-10	1.60-1.70	6.0-20	0.03-0.07	7.9-8.4	0-2	Low-----	0.10			
105----- Cajon	0-7	0-5	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	0-2	Low-----	0.15	5	1	.1-1
	7-25	0-5	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	0-2	Low-----	0.15			
	25-55	0-8	1.60-1.70	6.0-20	0.06-0.10	7.4-8.4	0-2	Low-----	0.15			
	55-60	0-5	1.60-1.70	6.0-20	0.04-0.08	7.4-8.4	0-2	Low-----	0.10			
106----- Cajon	0-10	0-5	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	0-2	Low-----	0.15	5	1	.1-1
	10-48	0-8	1.60-1.70	6.0-20	0.06-0.10	7.4-8.4	0-2	Low-----	0.15			
	48-60	0-5	1.60-1.70	6.0-20	0.04-0.08	7.4-8.4	0-2	Low-----	0.10			
108----- Cajon	0-4	0-5	1.60-1.70	6.0-20	0.04-0.06	7.4-8.4	0-0	Low-----	0.10	5	2	.5-1
	4-60	0-8	1.60-1.70	6.0-20	0.04-0.07	7.4-8.4	0-0	Low-----	0.10			
109----- Cajon	0-2	5-15	1.55-1.65	2.0-6.0	0.08-0.11	7.9-8.4	0-4	Low-----	0.24	5	5	.1-.5
	2-30	3-12	1.60-1.70	6.0-20	0.05-0.07	7.9-8.4	0-2	Low-----	0.15			
	30-60	2-10	1.60-1.70	6.0-20	0.03-0.07	7.9-8.4	0-2	Low-----	0.10			
111----- Neuralia	0-15	5-10	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	0-2	Low-----	0.20	3	2	0-.5
	15-33	18-30	1.50-1.60	0.2-0.6	0.11-0.16	7.4-8.4	0-2	Moderate	0.20			
	33-60	2-10	1.60-1.70	6.0-20	0.03-0.07	7.4-8.4	0-2	Low-----	0.10			
112----- Neuralia	0-19	2-8	1.60-1.70	6.0-20	0.05-0.07	7.4-8.4	0-2	Low-----	0.15	3	1	0-.5
	19-36	18-30	1.50-1.60	0.2-0.6	0.11-0.16	7.4-8.4	0-2	Moderate	0.20			
	36-60	2-10	1.60-1.70	6.0-20	0.03-0.07	7.4-8.4	0-2	Low-----	0.10			
113----- Neuralia	0-12	2-8	1.60-1.70	6.0-20	0.05-0.07	7.4-8.4	0-2	Low-----	0.15	3	1	0-.5
	12-39	18-30	1.50-1.60	0.2-0.6	0.11-0.16	7.4-8.4	0-2	Moderate	0.20			
	39-60	2-10	1.60-1.70	6.0-20	0.03-0.07	7.4-8.4	0-2	Low-----	0.10			

See footnote at end of table.

TABLE J.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion		Wind erodi- bility group	Organic matter
									factors			
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm		K	T		Pct
114*:												
Neuralia-----	0-15	5-10	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	0-2	Low-----	0.20	3	2	0-.5
	15-33	18-30	1.50-1.60	0.2-0.6	0.11-0.16	7.4-8.4	0-2	Moderate	0.20			
	33-60	2-10	1.60-1.70	6.0-20	0.03-0.07	7.4-8.4	0-2	Low-----	0.10			
Urban land-----	0-6	---	---	---	---	---	<2	-----	---	---	---	---
116, 117-----	0-12	0-8	1.60-1.70	6.0-20	0.05-0.07	7.4-8.4	0-2	Low-----	0.10	3	1	0-.5
Helendale	12-43	8-18	1.55-1.65	2.0-6.0	0.09-0.12	7.4-8.4	0-2	Low-----	0.24			
	43-48	3-10	1.60-1.70	6.0-20	0.06-0.09	7.4-8.4	0-2	Low-----	0.15			
	48-60	0-10	1.60-1.70	6.0-20	0.03-0.04	7.4-8.4	0-4	Low-----	0.10			
118*:												
Helendale-----	0-12	0-8	1.60-1.70	6.0-20	0.05-0.07	7.4-8.4	0-2	Low-----	0.10	3	1	0-.5
	12-43	8-18	1.55-1.65	2.0-6.0	0.09-0.12	7.4-8.4	0-2	Low-----	0.24			
	43-48	3-10	1.60-1.70	6.0-20	0.06-0.09	7.4-8.4	0-2	Low-----	0.15			
	48-60	0-10	1.60-1.70	6.0-20	0.03-0.04	7.4-8.4	0-4	Low-----	0.10			
Urban land-----	0-6	---	---	---	---	---	<2	-----	---	---	---	---
121, 122-----	0-4	1-5	1.60-1.70	6.0-20	0.04-0.07	6.6-8.4	0-2	Low-----	0.10	3	2	0-.5
Garlock	4-13	5-20	1.55-1.65	2.0-6.0	0.08-0.12	6.6-8.4	0-2	Low-----	0.15			
	13-39	20-35	1.45-1.55	0.2-0.6	0.13-0.15	6.6-8.4	0-2	Moderate	0.20			
	39-60	1-8	1.60-1.70	6.0-20	0.03-0.06	7.4-8.4	0-4	Low-----	0.05			
130-----	0-5	1-7	1.60-1.70	6.0-20	0.04-0.07	7.4-8.4	0-2	Low-----	0.10	5	1	0-.5
Lavic	5-32	8-15	1.55-1.70	2.0-6.0	0.09-0.12	7.4-8.4	0-4	Low-----	0.20			
	32-60	5-18	1.60-1.70	0.6-2.0	0.09-0.12	7.9-9.0	0-4	Low-----	0.15			
131*:												
Lavic-----	0-5	1-7	1.60-1.70	6.0-20	0.04-0.07	7.4-8.4	0-2	Low-----	0.10	5	1	0-.5
	5-32	8-15	1.55-1.70	2.0-6.0	0.09-0.12	7.4-8.4	0-4	Low-----	0.20			
	32-60	5-18	1.60-1.70	0.6-2.0	0.09-0.12	7.9-9.0	0-4	Low-----	0.15			
Urban land-----	0-6	---	---	---	---	---	<2	-----	---	---	---	---
135-----	0-8	0-6	1.60-1.70	>20	0.03-0.05	7.4-8.4	0-2	Low-----	0.10	5	4	0-.5
Arizo	8-60	3-10	1.60-1.70	>20	0.03-0.06	7.4-8.4	0-2	Low-----	0.10			
140*-----	0-6	35-70	---	<0.06	0.02-0.04	>8.4	>16	High-----	0.37	5	5	<.1
Playas	6-60	35-70	---	<0.06	0.02-0.04	>8.4	>16	High-----	0.37			
150*-----	0-60	---	---	---	---	---	<2	-----	---	---	8	---
Pits												

See footnote at end of table.

TABLE J.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm		K	T		Pct
155, 156----- Helendale	0-4	3-10	1.60-1.70	6.0-20	0.06-0.09	7.4-8.4	0-2	Low-----	0.20	3	2	0-.5
	4-27	8-18	1.55-1.65	2.0-6.0	0.09-0.12	7.4-8.4	0-2	Low-----	0.24			
	27-60	0-10	1.60-1.70	6.0-20	0.03-0.04	7.4-8.4	0-4	Low-----	0.10			
159*: Garlock-----	0-10	1-5	1.60-1.70	6.0-20	0.04-0.07	6.6-8.4	0-2	Low-----	0.10	3	2	0-.5
	10-26	5-20	1.55-1.65	2.0-6.0	0.08-0.12	6.6-8.4	0-2	Low-----	0.15			
	26-33	20-35	1.45-1.55	0.2-0.6	0.13-0.15	6.6-8.4	0-2	Moderate	0.20			
	33-60	1-8	1.60-1.70	6.0-20	0.03-0.06	7.4-8.4	0-4	Low-----	0.05			
Garlock, hard substratum-----	0-8	0-8	1.60-1.70	6.0-20	0.03-0.06	7.4-8.4	0-2	Low-----	0.10	3	2	0-.5
	8-29	18-35	1.45-1.65	0.2-0.6	0.12-0.15	7.4-8.4	0-2	Moderate	0.20			
	29-36	20-30	1.45-1.55	0.2-0.6	0.10-0.13	7.4-8.4	0-2	Moderate	0.17			
	36-50	4-10	1.60-1.70	6.0-20	0.03-0.06	7.4-8.4	0-4	Low-----	0.10			
	50-60	---	---	---	---	---	---	-----	---			
161----- Cajon	0-3	0-8	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	0-2	Low-----	0.15	5	1	0-.5
	3-7	3-12	1.60-1.70	6.0-20	0.05-0.07	7.9-8.4	0-2	Low-----	0.15			
	7-60	2-10	1.60-1.70	6.0-20	0.03-0.07	7.9-8.4	0-2	Low-----	0.10			
162*: Cajon-----	0-10	0-8	1.60-1.70	6.0-20	0.06-0.10	7.4-8.4	0-2	Low-----	0.15	5	2	.1-1
	10-55	0-8	1.60-1.70	6.0-20	0.06-0.10	7.4-8.4	0-2	Low-----	0.15			
	55-60	0-5	1.60-1.70	6.0-20	0.04-0.08	7.4-8.4	0-2	Low-----	0.10			
Helendale-----	0-6	3-10	1.60-1.70	6.0-20	0.04-0.08	7.4-8.4	0-2	Low-----	0.15	3	3	0-.5
	6-26	8-18	1.55-1.65	2.0-6.0	0.09-0.12	7.4-8.4	0-2	Low-----	0.24			
	26-60	0-10	1.60-1.70	6.0-20	0.03-0.04	7.4-8.4	0-4	Low-----	0.10			
165----- Rosamond	0-6	10-20	1.50-1.60	0.6-2.0	0.06-0.08	7.9-9.0	4-32	Low-----	0.37	5	3	.1-.5
	6-60	18-35	1.45-1.55	0.2-0.6	0.06-0.12	7.9-9.0	4-32	Moderate	0.43			
170----- Neuralia	0-6	4-10	1.60-1.70	6.0-20	0.06-0.09	7.4-8.4	0-2	Low-----	0.20	3	2	0-.5
	6-33	18-35	1.50-1.60	0.2-0.6	0.12-0.15	7.4-8.4	0-4	Moderate	0.24			
	33-45	3-10	1.60-1.70	6.0-20	0.03-0.07	7.4-8.4	0-4	Low-----	0.10			
	45-60	3-10	1.60-1.70	6.0-20	0.03-0.06	7.4-8.4	0-4	Low-----	0.05			
175*. Water												
180, 181----- Cerrocoso	0-3	5-18	1.50-1.60	2.0-6.0	0.07-0.09	7.4-8.4	0-2	Low-----	0.15	4	4	.1-.5
	3-21	25-35	1.40-1.55	0.2-0.6	0.13-0.15	7.9-9.0	0-4	Moderate	0.20			
	21-27	10-20	1.55-1.65	0.6-2.0	0.09-0.12	7.9-9.0	2-8	Low-----	0.20			
	27-60	1-8	1.60-1.70	2.0-6.0	0.04-0.08	7.4-8.4	2-16	Low-----	0.05			

See footnote at end of table.

TABLE J.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion		Wind erodi- bility group	Organic matter
									factors			
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm		K	T		Pct
182*:												
Cerrocoso-----	0-12	4-10	1.60-1.70	6.0-20	0.06-0.09	7.4-8.4	0-2	Low-----	0.17	4	2	.1-.5
	12-32	25-35	1.40-1.55	0.2-0.6	0.13-0.15	7.9-9.0	0-4	Moderate	0.20			
	32-36	10-20	1.55-1.65	0.6-2.0	0.09-0.12	7.9-9.0	2-8	Low-----	0.20			
	36-60	1-8	1.60-1.70	2.0-6.0	0.04-0.08	7.4-8.4	2-16	Low-----	0.05			
Urban land-----	0-6	---	---	---	---	---	<2	-----	---	---	---	---
190*:												
Sparkhule-----	0-2	10-15	1.55-1.65	2.0-6.0	0.05-0.08	7.4-7.8	0-2	Low-----	0.15	1	5	.1-1
	2-12	25-35	1.40-1.55	0.2-0.6	0.12-0.15	7.4-7.8	0-2	Moderate	0.20			
	12-16	---	---	---	---	---	---	-----	---			
	16	---	---	---	---	---	---	-----	---			
Rock outcrop----	0-60	---	---	---	---	---	<2	-----	---	---	8	---
200*-----	0-6	---	---	---	---	---	<2	-----	---	---	---	---
Urban land												
211-----	0-12	2-8	1.60-1.70	6.0-20	0.05-0.07	7.4-8.4	0-2	Low-----	0.15	3	1	0-.5
Lewkalb	12-28	3-10	1.60-1.70	6.0-20	0.06-0.09	7.4-8.4	0-2	Low-----	0.17			
	28-49	5-15	1.50-1.60	0.6-2.0	0.08-0.13	8.5-9.0	0-4	Low-----	0.28			
	49-60	---	---	---	---	---	---	-----	---			
221-----	0-1	6-10	1.60-1.70	6.0-20	0.06-0.09	7.9-8.4	0-2	Low-----	0.15	1	2	0-.5
Alko	1-15	10-15	1.55-1.65	2.0-6.0	0.09-0.11	7.9-8.4	0-4	Low-----	0.17			
	15-28	---	---	---	---	---	---	-----	---			
	28-60	8-15	1.50-1.65	2.0-6.0	0.06-0.12	7.9-8.4	0-4	Low-----	0.20			
291*:												
Cajon-----	0-10	0-8	1.60-1.70	6.0-20	0.06-0.10	7.4-8.4	0-2	Low-----	0.15	5	2	.1-1
	10-51	0-8	1.60-1.70	6.0-20	0.06-0.10	7.4-8.4	0-2	Low-----	0.15			
	51-56	0-5	1.60-1.70	6.0-20	0.04-0.08	7.4-8.4	0-2	Low-----	0.10			
	56-60	0-5	1.60-1.70	6.0-20	0.06-0.10	7.4-8.4	0-2	Low-----	0.15			
Urban land-----	0-6	---	---	---	---	---	<2	-----	---	---	---	---
292*:												
Lewkalb-----	0-12	2-8	1.60-1.70	6.0-20	0.05-0.07	7.4-8.4	0-2	Low-----	0.15	3	1	0-.5
	12-28	3-10	1.60-1.70	6.0-20	0.06-0.09	7.4-8.4	0-2	Low-----	0.17			
	28-49	5-15	1.50-1.60	0.6-2.0	0.08-0.13	8.5-9.0	0-4	Low-----	0.28			
	49-60	---	---	---	---	---	---	-----	---			
Urban land-----	0-6	---	---	---	---	---	<2	-----	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE K.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare" and "brief" are explained in the text.

symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					<u>Ft</u>		<u>In</u>		<u>In</u>			
102----- Cajon	A	Rare-----	---	---	>6.0	---	>60	---	---	---	Moderate	Low.
104----- Cajon	A	Occasional	Very brief	Jan-Dec	>6.0	---	>60	---	---	---	High-----	Low.
105----- Cajon	A	Rare-----	---	---	>6.0	---	>60	---	---	---	Moderate	Low.
106, 108----- Cajon	A	None-----	---	---	>6.0	---	>60	---	---	---	Moderate	Low.
109----- Cajon	A	Occasional	Very brief	Jan-Dec	>6.0	---	>60	---	---	---	High-----	Low.
111----- Neuralia	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
112, 113----- Neuralia	B	None-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
114*: Neuralia-----	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
Urban land-----	-	Rare-----	---	---	>6.0	---	>10	---	---	---	---	---
116----- Helendale	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
117----- Helendale	B	None-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
118*: Helendale-----	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
118*: Urban land-----	-	Rare-----	---	---	>6.0	---	>10	---	---	---	---	---

See footnote at end of table.

TABLE K.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Months	Depth	Hard- ness	Depth	Hard- ness	Uncoated steel	Concrete
					<u>Ft</u>		<u>In</u>		<u>In</u>			
121----- Garlock	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
122----- Garlock	B	None-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
130----- Lavic	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
131*: Lavic-----	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
Urban land----	-	Rare-----	---	---	>6.0	---	>10	---	---	---	---	---
135----- Arizo	A	Occasional	Very brief	Oct-Apr	>6.0	---	>60	---	---	---	High-----	Low.
140*----- Playas	D	Frequent---	---	---	+1-1.0	Oct-Apr	>60	---	---	---	High-----	High.
150*----- Pits	-	Rare-----	---	---	>6.0	---	>60	---	---	---	---	---
155----- Helendale	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
156----- Helendale	B	None-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
159*: Garlock-----	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
Garlock, hard substratum----	B	Rare-----	---	---	>6.0	---	>60	---	40-60	Thin	High-----	Low.
161----- Cajon	A	Occasional	Very brief	Jan-Dec	>6.0	---	>60	---	---	---	High-----	Low.
162*: Cajon-----	A	None-----	---	---	>6.0	---	>60	---	---	---	Moderate	Low.
Helendale-----	B	None-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.

See footnote at end of table.

TABLE K.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					<u>Ft</u>		<u>In</u>		<u>In</u>			
165----- Rosamond	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
170----- Neuralia	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
175*: Water												
180----- Cerrocoso	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
181----- Cerrocoso	B	None-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
182*: Cerrocoso-----	B	Rare-----	---	---	>6.0	---	>60	---	---	---	High-----	Low.
Urban land-----	-	Rare-----	---	---	>6.0	---	>10	---	---	---	---	---
190*: Sparkhule-----	D	None-----	---	---	>6.0	---	12-20	Hard	---	---	High-----	Low.
Rock outcrop---	D	None-----	---	---	>6.0	---	0	Hard	---	---	---	---
200*----- Urban land	-	Rare-----	---	---	>6.0	---	>10	---	---	---	---	---
211----- Lewkalb	B	Rare-----	---	---	>6.0	---	>60	---	40-60	Thick	High-----	Low.
221----- Alko	D	Rare-----	---	---	>6.0	---	>60	---	10-20	Thick	High-----	Low.
291*: Cajon-----	A	Rare-----	---	---	>6.0	---	>60	---	---	---	Moderate	Low.
Urban land-----	-	Rare-----	---	---	>6.0	---	>10	---	---	---	---	---
292*: Lewkalb-----	B	Rare-----	---	---	>6.0	---	>60	---	40-60	Thick	High-----	Low.
Urban land-----	-	Rare-----	---	---	>6.0	---	>10	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE L.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
102----- Cajon	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy.
104----- Cajon	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
105----- Cajon	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy.
106, 108----- Cajon	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: seepage, too sandy.
109----- Cajon	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
111----- Neuralia	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy, small stones.
112, 113----- Neuralia	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: too sandy, small stones.
114*: Neuralia-----	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: too sandy, small stones.
Urban Land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
116----- Helendale	Severe: poor filter.	Severe: seepage.	Moderate: flooding.	Moderate: flooding.	Fair: thin layer.

See footnote at end of table.

TABLE L.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank	Sewage lagoon	Trench	Area	Daily cover
117-----Helendale	Severe: poor filter.	Severe: seepage.	Slight-----	Slight-----	Fair: thin layer.
118*-----Helendale	Severe: poor filter.	Severe: seepage.	Moderate: flooding.	Moderate: flooding.	Fair: thin layer.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
121-----Garlock	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
122-----Garlock	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: seepage, too sandy, small stones.
130-----Lavic	Moderate: flooding. percs slowly.	Severe: seepage.	Moderate: flooding, too sandy.	Moderate: flooding.	Fair: too sandy, small stones.
131*-----Lavic	Moderate: flooding. percs slowly.	Severe: seepage.	Moderate: flooding, too sandy.	Moderate: flooding.	Fair: too sandy, small stones.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
135-----Arizo	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
140*-----Playas	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
150*-----Pits	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
155-----Helendale	Severe: poor filter.	Severe: seepage.	Moderate: flooding.	Moderate: flooding.	Fair: thin layer.

See footnote at end of table.

TABLE L.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
156----- Helendale	Severe: poor filter.	Severe: seepage.	Slight-----	Slight-----	Fair: thin layer.
159*: Garlock-----	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
Garlock, hard substratum-----	Severe: percs slowly, poor filter.	Severe: seepage.	Moderate: flooding, cemented pan.	Moderate: flooding.	Poor: small stones.
161----- Cajon	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
162*: Cajon-----	Severe: poor filter.	Severe: seepage, slope.	Severe: too sandy.	Moderate: slope.	Poor: seepage, too sandy.
Helendale-----	Severe: poor filter.	Severe: seepage.	Slight-----	Slight-----	Fair: thin layer.
165----- Rosamond	Severe: percs slowly.	Slight-----	Severe: excess salt.	Moderate: flooding.	Good.
170-- Neuralia	Severe: percs slowly, poor filter.	Severe: seepage.	Moderate: flooding.	Moderate: flooding.	Fair: small stones, thin layer.
175*. Water					
180----- Cerrocoso	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
181----- Cerrocoso	Moderate: percs slowly.	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE L.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
182*: Cerrocoso-----	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
190*: Sparkhule-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, small stones, slope.
Rock outcrop-----	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
200*----- Urban land	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
211----- Lewkalb	Moderate: flooding. cemented pan.	Severe: seepage.	Severe: cemented pan.	Moderate: flooding.	Poor: thin layer.
221----- Alko	Severe: cemented pan.	Severe: seepage, cemented pan.	Severe: cemented pan.	Moderate: flooding.	Poor: cemented pan.
291*: Cajon-----	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
292*: Lewkalb-----	Moderate: flooding. cemented pan.	Severe: seepage.	Severe: cemented pan.	Moderate: flooding.	Poor: thin layer.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE M.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
102----- Cajon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.
104----- Cajon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.
105----- Cajon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty, too sandy.
106----- Cajon	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty, too sandy.
108----- Cajon	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Severe: droughty.
109----- Cajon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
111----- Neuralia	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: shrink-swell, flooding.	Moderate: droughty.
112, 113----- Neuralia	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: droughty, too sandy.
114*: Neuralia-----	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
116----- Helendale	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.

See footnote at end of table.

TABLE M.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
117----- Helendale	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty.
118*: Helendale-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
121----- Garlock	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: too sandy.
122----- Garlock	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Severe: too sandy.
130----- Lavic	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty, too sandy.
131*: Lavic-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty, too sandy.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
135----- Arizo	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: large stones, droughty, too sandy.
140*----- Playas	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, ponding, droughty.
150*----- Pits	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
155----- Helendale	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
156----- Helendale	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty.

See footnote at end of table.

TABLE M.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
159*: Garlock-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: too sandy.
Garlock, hard substratum-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: shrink-swell, flooding.	Severe: too sandy.
161----- Cajon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.
162*: Cajon-----	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Helendale-----	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: small stones, droughty.
165----- Rosamond	Slight-----	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Severe: excess salt, excess sodium
170----- Neuralia	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: shrink-swell, flooding.	Moderate: droughty.
175*. Water						
180----- Cerrocoso	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: excess sodium.
181----- Cerrocoso	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Severe: excess sodium.
182*: Cerrocoso-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: excess sodium.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

See footnote at end of table.

TABLE M.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
190*:						
Sparkhule-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, slope, depth to rock.
Rock outcrop-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
200*-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
Urban land						
211-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: excess sodium.
Lewkalb						
221-----	Severe: cemented pan, cutbanks cave.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: cemented pan.
Alko						
291*:						
Cajon-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding...	Moderate: droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
292*:						
Lewkalb-----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: excess sodium.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE N.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
102----- Cajon	Good-----	Probable-----	Probable-----	Poor: small stones.
104----- Cajon	Good-----	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
105, 106----- Cajon	Good-----	Probable-----	Improbable: thin layer.	Poor: too sandy, small stones.
108----- Cajon	Good-----	Probable-----	Probable-----	Poor: small stones.
109----- Cajon	Good-----	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
111, 112, 113----- Neuralia	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
114*: Neuralia-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable.
116, 117----- Helendale	Good-----	Probable-----	Probable-----	Fair: small stones, area reclaim.
118*: Helendale-----	Good-----	Probable-----	Probable-----	Fair: small stones, area reclaim.

See footnote at end of table.

TABLE N.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Urban Land-----	Variable-----	Variable-----	Variable-----	Variable.
121, 122----- Garlock	Good-----	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
130*: Lavic-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
131*: Lavic-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable.
135----- Arizo	Good-----	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
140*----- Playas	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt, wetness.
150*----- Pits	Variable-----	Variable-----	Variable-----	Variable.
155, 156----- Helendale	Good-----	Probable-----	Probable-----	Poor: small stones.
159*: Garlock-----	Good-----	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
Garlock, hard substratum-----	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, area reclaim.

See footnote at end of table.

TABLE N.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
161----- Cajon	Good-----	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
162*: Cajon-----	Good-----	Probable-----	Improbable: thin layer.	Poor: too sandy, small stones.
Helendale-----	Good-----	Probable-----	Probable-----	Poor: small stones.
165----- Rosamond	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.
170----- Neuralia	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
175*. Water				
180, 181----- Cerrocoso	Good-----	Probable-----	Probable-----	Poor: too clayey, small stones, area reclaim.
182*: Cerrocoso-----	Good-----	Probable-----	Probable-----	Poor: too clayey, small stones, area reclaim.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable.
190*: Sparkhule-----	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop-----	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE N.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
200*----- Urban land	Variable-----	Variable-----	Variable-----	Variable.
211----- Lewkalb	Fair: cemented pan, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
221----- Alko	Poor: cemented pan.	Improbable: excess fines.	Improbable: excess fines.	Poor: cemented pan.
291*: Cajon-----	Good-----	Probable-----	Improbable: thin layer.	Poor: too sandy, small stones.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable.
292*: Lewkalb-----	Fair: cemented pan, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE P.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
102----- Cajon	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
104----- Cajon	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy-----	Too arid.
105----- Cajon	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
106, 108----- Cajon	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
109----- Cajon	Severe: seepage.	Severe: seepage.	Deep to water	Droughty-----	Too sandy-----	Too arid.
111----- Neuralia	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
112, 113----- Neuralia	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
114*: Neuralia-----	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
116----- Helendale	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake.	Soil blowing---	Too arid, droughty.
117----- Helendale	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Soil blowing---	Too arid, droughty.

See footnote at end of table.

TABLE P.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
118*: Helendale-----	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake.	Soil blowing---	Too arid, droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
121----- Garlock	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
122----- Garlock	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
130----- Lavic	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
131*: Lavic-----	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
135----- Arizo	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Large stones, too sandy.	Too arid, large stones
140*----- Playas	Slight-----	Severe: hard to pack, ponding, excess salt.	Ponding, percs slowly, flooding.	Ponding, droughty, slow intake.	Erodes easily, ponding, percs slowly.	Wetness, excess salt, erodes easily
150*----- Pits	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
155----- Helendale	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake.	Soil blowing---	Too arid, droughty.
156----- Helendale	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Soil blowing---	Too arid, droughty.

See footnote at end of table.

TABLE P.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
159*: Garlock-----	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
Garlock, hard substratum-----	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
161----- Cajon	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Too sandy-----	Too arid.
162*: Cajon-----	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Too arid, slope, droughty.
Helendale-----	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Soil blowing---	Too arid, droughty.
165----- Rosamond	Slight-----	Severe: excess sodium, excess salt.	Deep to water	Droughty, soil blowing, erodes easily.	Erodes easily, soil blowing.	Too arid, excess salt, excess sodium.
170----- Neuralia	Severe: seepage.	Severe: thin layer.	Deep to water	Droughty, fast intake.	Soil blowing---	Too arid, droughty.
175*. Water						
180----- Cerrocoso	Severe: seepage.	Severe: seepage, excess sodium.	Deep to water	Droughty-----	Too sandy-----	Too arid, excess sodium.
181----- Cerrocoso	Severe: seepage.	Severe: seepage, excess sodium.	Deep to water	Slope, droughty.	Too sandy-----	Too arid, excess sodium.

See footnote at end of table.

TABLE P.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
182*:						
Cerrocoso-----	Severe: seepage.	Severe: seepage, excess sodium.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, excess sodium.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
190*:						
Sparkhule-----	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Too arid, slope, depth to rock.
Rock outcrop----	Severe: depth to rock, slope.	Slight-----	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock
200*-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
Urban land						
211-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Droughty, fast intake.	Soil blowing---	Too arid, excess sodium, droughty.
Lewkalb						
221-----	Severe: seepage, cemented pan.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Cemented pan, too sandy.	Too arid, droughty.
Alko						
291*:						
Cajon-----	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
292*:						
Lewkalb-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Droughty, fast intake.	Soil blowing---	Too arid, excess sodium, droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 1.--WILDLIFE HABITAT FOR BURROWING MAMMALS AND REPTILES

Soil Name and Map Symbol	Interpretive Ratings
102----- Cajon (CA0550)	Poorly suited: too sandy.
104----- Cajon (CA1769)	Poorly suited: flooding, too sandy.
105----- Cajon (CA0289)	Poorly suited: too sandy.
106----- Cajon (CA0289)	Poorly suited: too sandy.
108----- Cajon (CA0550)	Poorly suited: too sandy.
109----- Cajon (CA1769)	Poorly suited: flooding, too sandy.
111----- Neuralia (CA1771)	Suited: flooding, too sandy.
112----- Neuralia (CA1771)	Poorly suited: too sandy.
113----- Neuralia (CA1771)	Suited: too clayey.
114: Neuralia (CA1771)-----	Suited: too sandy.
Urban Land.	
116----- Helendale (CA1770)	Suited: flooding.
117----- Helendale (CA1770)	Well suited.

TABLE 1.--WILDLIFE HABITAT FOR BURROWING MAMMALS AND REPTILES

Soil Name and Map Symbol	Interpretive Ratings
118: Helendale (CA1770)-----	Suited: flooding.
Urban Land.	
121----- Garlock (CA2003)	Suited: flooding, too clayey.
122----- Garlock (CA2003)	Suited: too clayey.
130----- Lavic (CA9345)	Suited: flooding, too sandy.
131: Lavic (CA9345)-----	Suited: flooding, too sandy.
Urban Land.	
135----- Arizo (CA2756)	Poorly suited: flooding, too sandy.
140. Playas	
150. Pits	
155----- Helendale (CA1770)	Suited: flooding.
156----- Helendale (CA1770)	Well suited.
159: Garlock (CA2003)-----	Suited: flooding.

TABLE 1.--WILDLIFE HABITAT FOR BURROWING MAMMALS AND REPTILES

Soil Name and Map Symbol	Interpretive Ratings
159: Garlock, Hard Substratum (CA2007)-----	Suited: flooding, too clayey.
161----- Cajon (CA1769)	Poorly suited: flooding, too sandy.
162: Cajon (CA0289)-----	Poorly suited: too sandy.
Helendale (CA1770)-----	Well suited.
165----- Rosamond (CA0130)	Suited: flooding, too clayey.
170----- Neuralia (CA1990)	Suited: flooding, too clayey.
175. Water	
180----- Cerrocoso (CA1995)	Poorly suited: too clayey.
181----- Cerrocoso (CA1995)	Poorly suited: too clayey.
182: Cerrocoso (CA1995)-----	Poorly suited: too clayey.
Urban Land.	
190: Sparkhule (CA2004)-----	Suited: depth to rock, too clayey.
Rock Outcrop.	

TABLE 1.--WILDLIFE HABITAT FOR BURROWING MAMMALS AND REPTILES

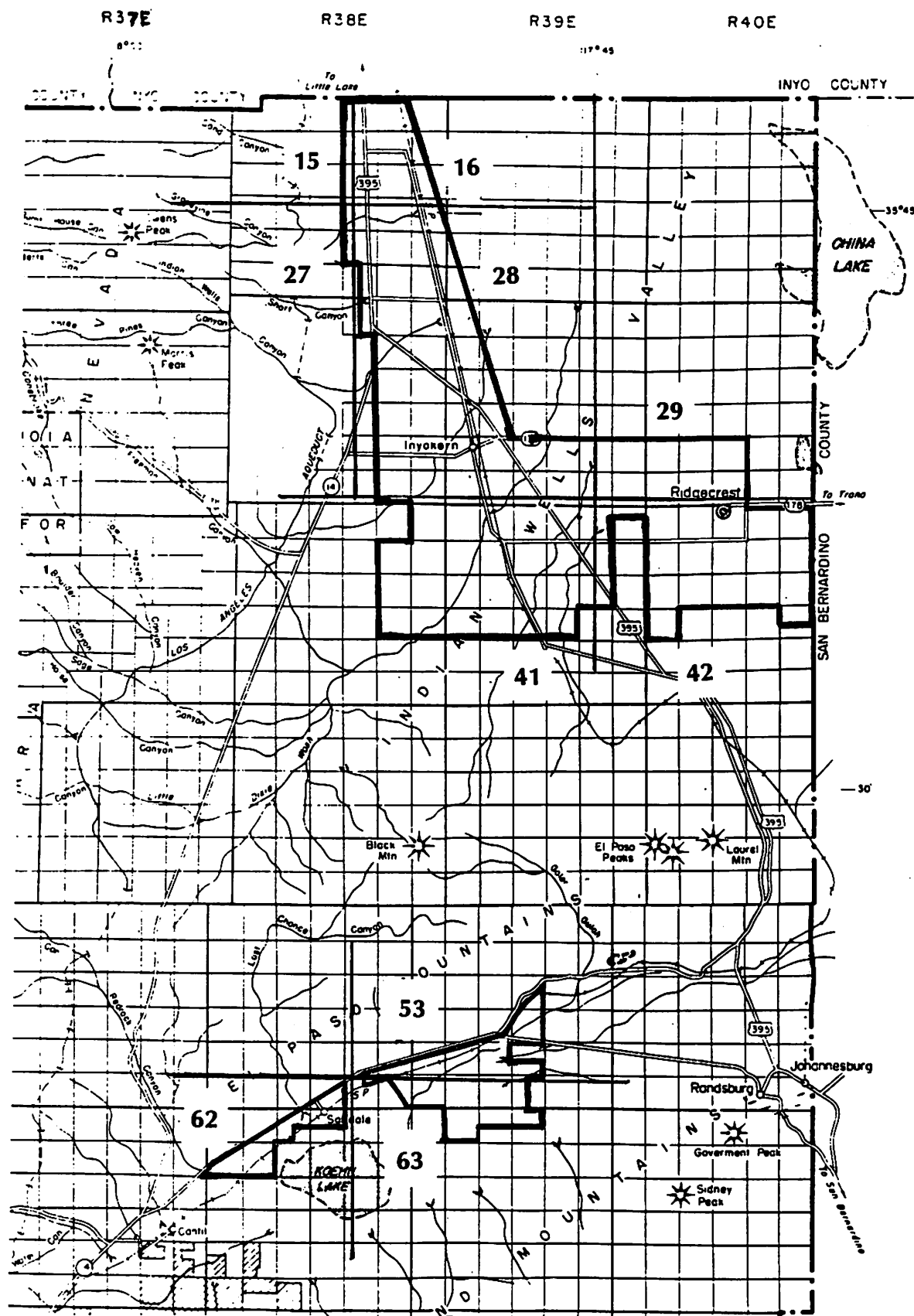
Soil Name and Map Symbol	Interpretive Ratings
200. Urban Land	
211----- Lewkalb (CA9286)	Suited: flooding, too sandy.
221----- Alko (CA2755)	Suited: flooding, cemented pan, too sandy.
291: Cajon (CA0289)-----	Poorly suited: too sandy.
Urban Land.	
292: Lewkalb (CA9286)-----	Suited: flooding, too sandy.
Urban Land.	

TABLE 9.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is taxajunct 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
Alko-----	Loamy, mixed, thermic, shallow Typic Durorthids
Arizo-----	Sandy-skeletal, mixed, thermic Typic Torriorthents
Cajon-----	Mixed, thermic Typic Torripsamments
Cerritoso-----	Fine-loamy, mixed, thermic Duric Natrargids
Garlock-----	Fine-loamy, mixed, thermic Typic Haplargids
Garlock, hard substratum	Fine-loamy, mixed, thermic Typic Haplargids
Helendale-----	Coarse-loamy, mixed, thermic Typic Haplargids
Lavic-----	Coarse-loamy, mixed, thermic Typic Calciorthids
*Lewkalsb-----	Coarse-loamy, mixed (calcareous), thermic Haploduridic Torriorthents
Neuralia-----	Fine-loamy, mixed, thermic Typic Haplargids
Pits.	
Playas.	
Rock outcrop.	
Rosamond-----	Fine-loamy, mixed (calcareous), thermic Typic Torrifluvents
Sparkhule-----	Loamy, mixed, thermic Lithic Haplargids
Urban land.	
Water.	

Appendix



Index to Map Sheets

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
CULTURAL FEATURES		CULTURAL FEATURES (cont.)		SPECIAL SYMBOLS FOR SOIL SURVEY	
BOUNDARIES		MISCELLANEOUS CULTURAL FEATURES		* SOIL DELINEATIONS AND SOIL SYMBOLS	
National, state, or province		Farmstead, house (omit in urban areas)	•	ESCARPMENTS	
County or parish		Church	✠	Bedrock (points down slope)	
Minor civil division		School	✠	Other than bedrock (points down slope)	
Reservation (national forest or park, state forest or park, and large airport)		Indian mound (label)	∩	SHORT STEEP SLOPE	
Land grant		Located object (label)	○	GULLY	
* Limit of soil survey (label)		Tank (label)	•	DEPRESSION OR SINK	○
Field sheet matching & neckline		Wells, oil or gas	⚡	MISCELLANEOUS	
AD HOC BOUNDARY (label)		Windmill	⚙	Blowout	∩
Small airport, airfield, park, oilfield, cemetery, or flood pool		Kitchen midden	∩	Clay spot	✱
STATE COORDINATE TICK		WATER FEATURES		Gravelly spot	•••
* LAND DIVISION CORNERS (sections and land grants)		DRAINAGE		Gumbo, silt, or scabby spot (sodic)	⊙
ROADS		Perennial, double line		Dumps and other similar non soil areas	≡
Divided (median shown if scale permits)		Perennial, single line		Prominent hill or post	⬤
* County, farm or ranch		* Intermittent		Rock outcrop (includes sandstone and shale)	∇
Trail		Drainage and			
ROAD EMBLEMS & DESIGNATIONS		Canals or ditches			
Interstate		Double - line (label)			
* Federal		Drainage and/or irrigation			
* State		LAKES, PONDS AND RESERVOIRS			
Other		Perennial			
RAILROAD		Intermittent			
POWER TRANSMISSION LINE (normally not shown)		MISCELLANEOUS WATER FEATURES			
PIPE LINE (normally not shown)		Marsh or swamp			
FENCE (normally not shown)		Spring	○		
LEVEES		Well, irrigation	⚡		
Without road		Well, oil/gas	⚡		
With road		Well, other	⚡		
With railroad					
DAMS					
Large (to scale)					
Medium or small					
PITS					
Gravel pit	✱				
Mine or quarry	✱				

* Symbols used in this survey area