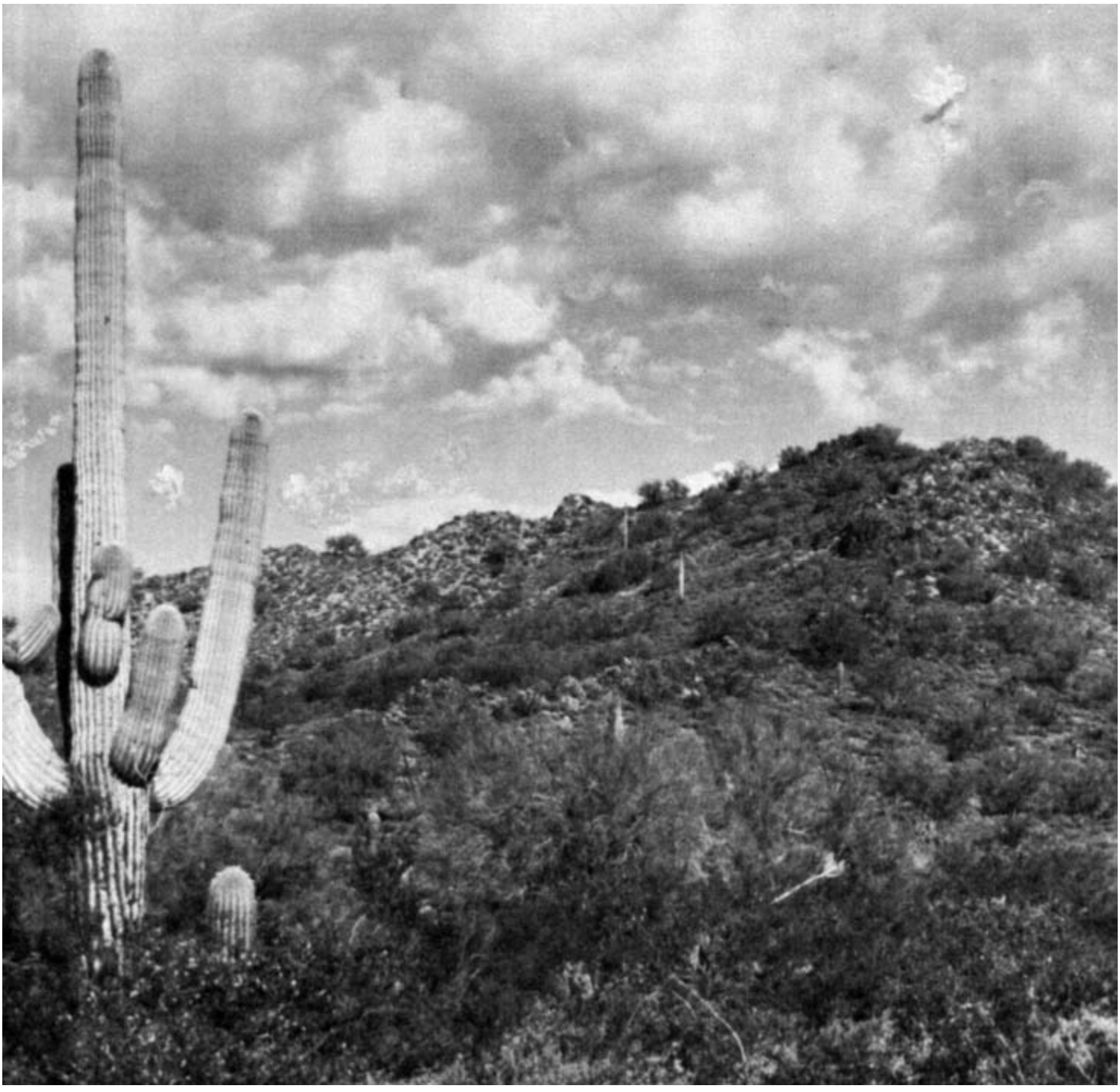
United States Department of Agriculture

Soil Conservation Service

In Cooperation with United States Department of the Interior, Bureau of Indian Affairs and Bureau of Land Management, and the Arizona Agricultural Experiment Station

Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona



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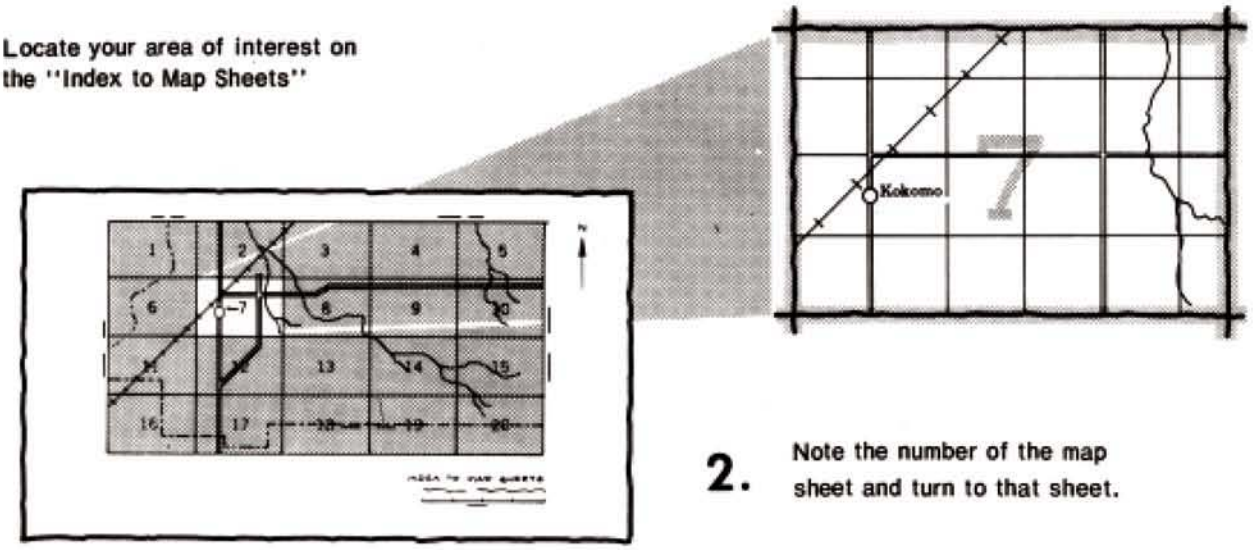

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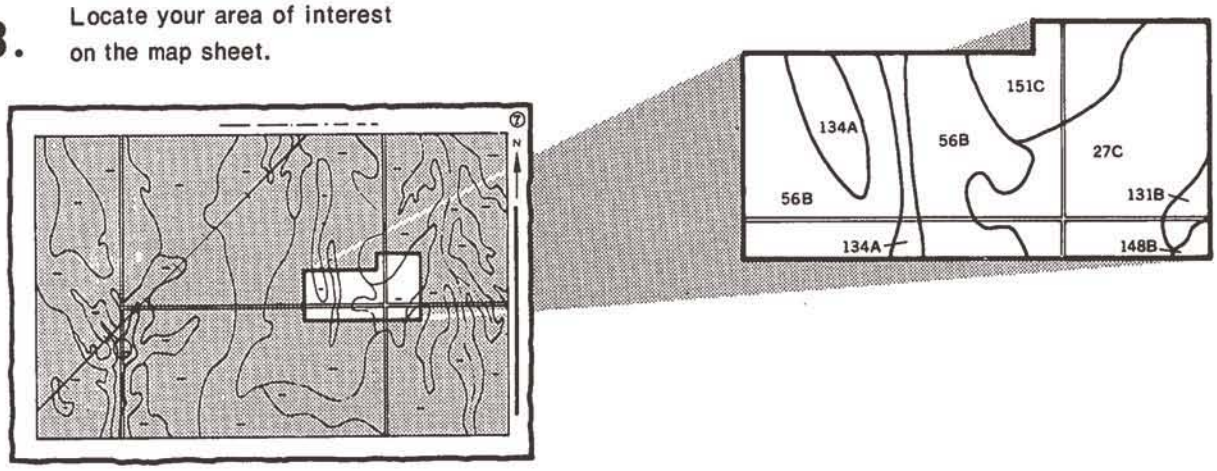

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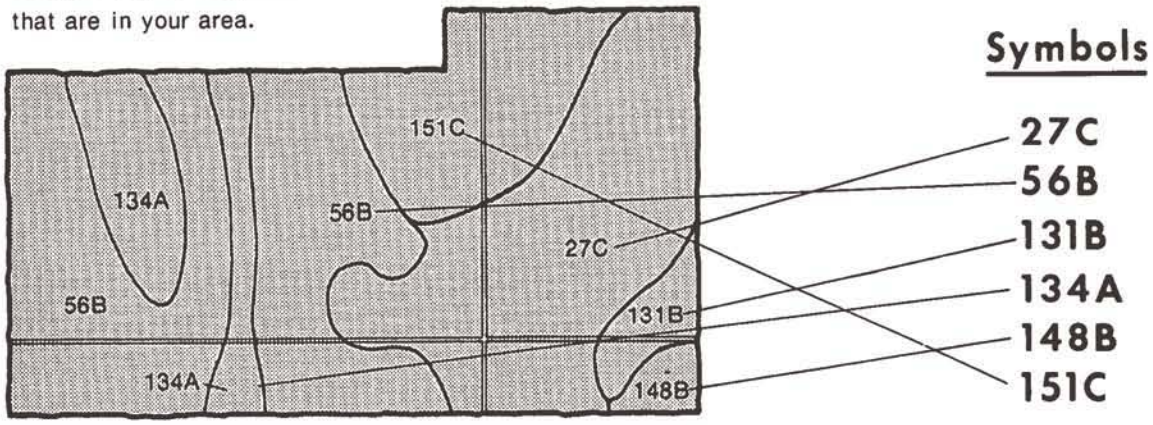

THIS SOIL SURVEY

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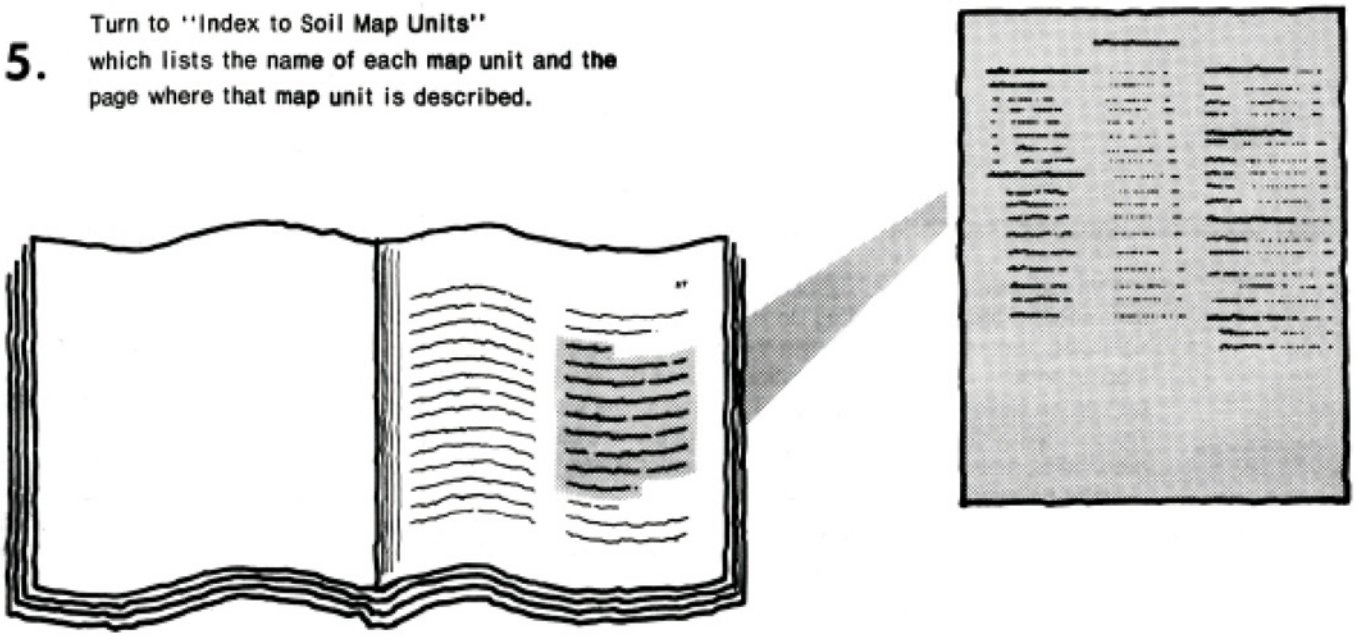
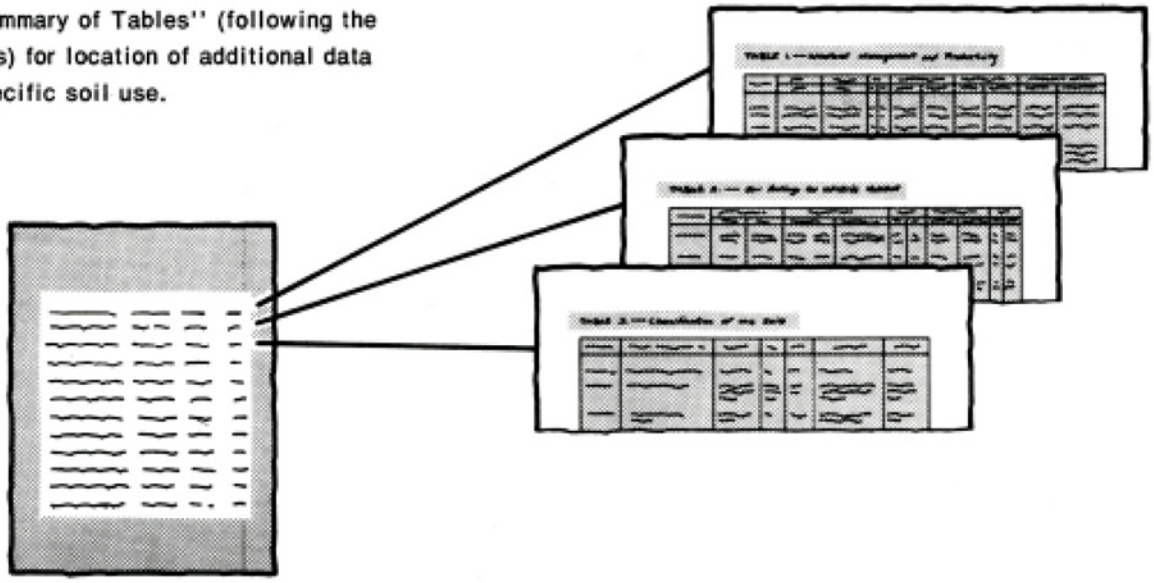


6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service, the Bureau of Indian Affairs and Bureau of Land Management, and the Arizona Agricultural Experiment Station. It is part of the technical assistance furnished to the Agua Fria-New River, Buckeye-Roosevelt, East Maricopa, and Wickenburg Natural Resource Conservation Districts.

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

Cover: Desert plants on Valva very gravelly loam, 1 to 20 percent slopes. Dominant plants are saguaro, triangle bursage, and littleleaf paloverde.

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Foreword

This soil survey contains information that can be used in land-planning programs in Maricopa and Pinal Counties. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

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

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

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

Verne M. Bathurst
State Conservationist
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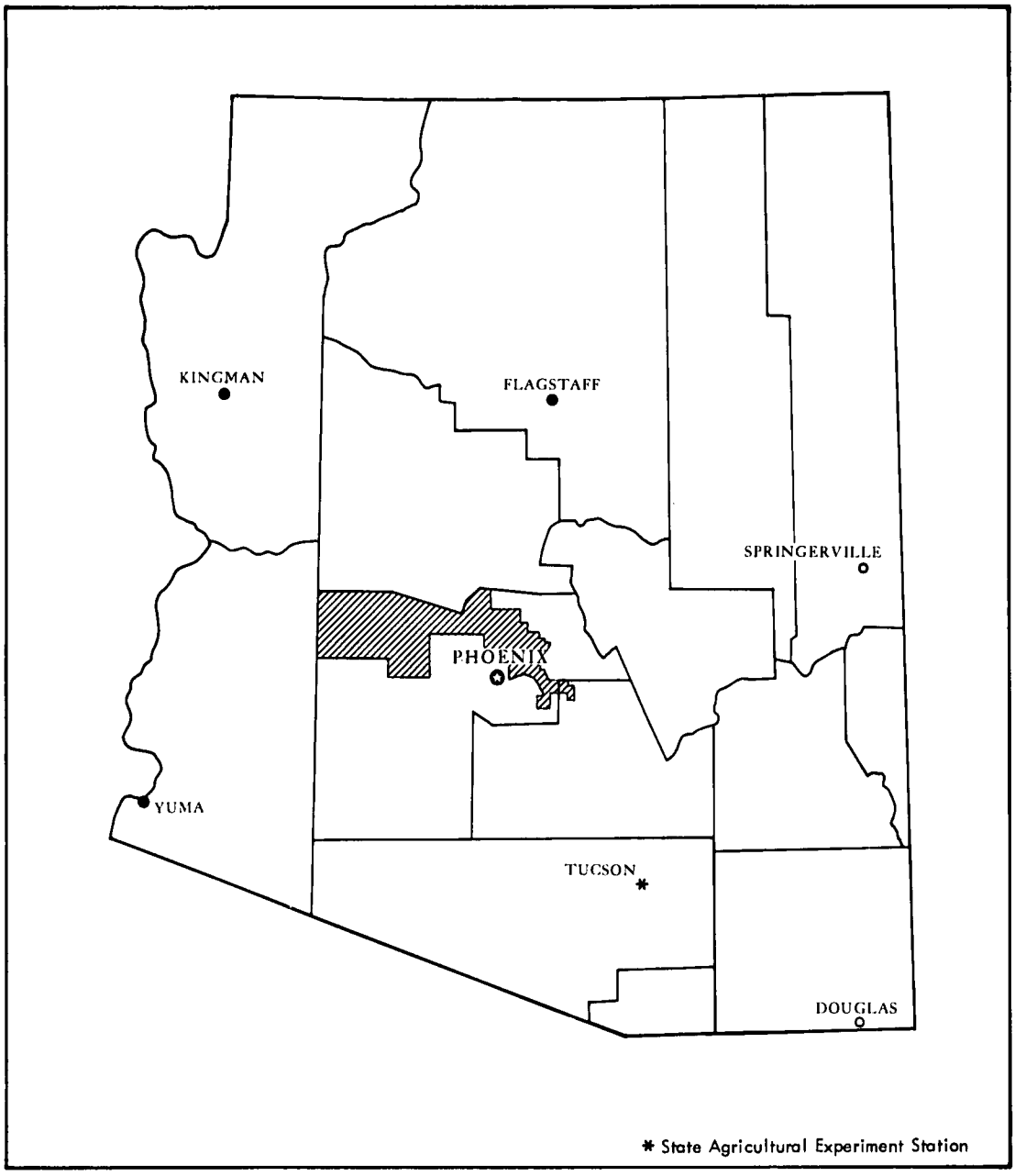

Location of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, in Arizona.

Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona

By Philip D. Camp, Soil Conservation Service

Fieldwork by Philip D. Camp, Thomas J. Craft, Alfred A. Dewall, Donald F. White, Harlan E. Jacoby, George W. Hartman, and Mon S. Yee, Soil Conservation Service

United States Department of Agriculture,
Soil Conservation Service,
In cooperation with
United States Department of the Interior,
Bureau of Indian Affairs and Bureau of Land Management,
and the Arizona Agricultural Experiment Station

The AGUILA-CAREFREE AREA, parts of Maricopa and Pinal Counties, is in the south-central part of Arizona. It has a total area of 1,629,120 acres, about 1,602,370 acres of which is in northern Maricopa County and 26,750 acres is in north-central Pinal County. The survey area borders Yuma County on the west, Yavapai County on the north, and the Tonto National Forest on the northeast and east. The southern border joins this survey area with the Maricopa County, Arizona, Central Part, survey area and the Eastern Maricopa and Northern Pinal Counties Area, Arizona, survey area.

Most of the survey area is desert; vegetation generally is sparse. The area is used mainly as rangeland, although a small part is irrigated cropland. Included within the survey area are the cities of Apache Junction, Carefree, Cave Creek, New River, and Wickenburg. Also included are parts of the cities of Phoenix, Scottsdale, and Paradise Valley. Smaller communities in the survey area include Aguila, Morristown, and Wittman. Increasingly rapid urbanization is taking place, particularly in the Phoenix and Scottsdale areas. Also included in the survey area are the Salt River Pima-Maricopa Indian Community and the Fort McDowell Mohave-Apache Indian Community.

Land ownership in the survey area is private, state, or federal. A large acreage in the western part is administered by the Department of the Interior, Bureau of Land Management.

Many of the soils in the survey area are suited to use as rangeland. Low precipitation is the most limiting factor for forage production. The dominant soil characteristics that limit grazing are the presence of lime in the surface layer and steepness of slope.

Most of the nonirrigated soils in the survey area are not suitable for use as cropland. Water is either unavailable or uneconomical to obtain in these areas. If water were available, many of the soils would still not be suitable for cultivation because they are too steep, too shallow, or too gravelly.

Some of the soils in the survey area have few limitations for urban development. Others have moderate to severe limitations. The major limitations are the depth to bedrock or to a hardpan, slope, shrink-swell potential, and slow permeability.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent soil survey areas. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey area. In general, surveys of the areas south of this area are more detailed because the soils are used mainly as cropland and for urban development.

All map delineations join with adjacent survey areas except for a few delineations along the southern border of this survey area. This is the result of two map units in the Maricopa County, Central Part, survey being combined and delineated as one map unit in this survey.

General Nature of the Survey Area

This section briefly discusses the climate and the physiography, relief, and drainage of the survey area.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

In this survey area, summers are long and very hot. Winters are quite warm except for an occasional period when the nightly minimum temperature drops below freezing. Rainfall is scant in all months.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Buckeye and Wickenburg in the period 1951 to 1978. The data given are based on incomplete records. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

Buckeye is just outside of the survey area, but climatic data for it are representative of the hotter, drier part of the survey area. Wickenburg is representative of the slightly cooler, moister part of the area.

In winter, the average temperature is 53 degrees F at Buckeye and 49 degrees at Wickenburg. The average daily minimum temperature is 36 degrees at Buckeye and 32 degrees at Wickenburg. The lowest temperature on record, which occurred at Wickenburg on January 3, 1974, is 12 degrees. In summer, the average temperature is 89 degrees at Buckeye and 84 degrees at Wickenburg. The average daily maximum temperature is 104 degrees. The highest recorded temperature, which occurred at Buckeye on July 12, 1958, is 120 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 7 inches at Buckeye and 11 inches at Wickenburg. Of this, 50 percent usually falls in April through September, which includes the growing season for most crops. The heaviest 1-day rainfall during the period of record was 2.93 inches at Wickenburg on August 29, 1951. Thunderstorms occur on about 25 days each year, and most occur in summer.

Snowfall is rare. In 100 percent of the winters at Buckeye and 95 percent at Wickenburg, there is no measurable snowfall. The heaviest 1-day snowfall on record was more than 4 inches.

The average relative humidity in midafternoon is about 20 percent. Humidity is higher at night, and the average at dawn is about 50 percent. The percentage of possible sunshine is 90 percent of the time in summer and 80 percent in winter. The prevailing wind is from the east. Average windspeed is highest, 7 miles per hour, in summer. Strong, dry, dusty winds with gusts as much as 75 miles per hour occur at times in summer and winter.

Physiography, Relief, and Drainage

The survey area is characterized by broad areas of alluvial fans and fan terraces separated by mountain ranges (fig. 1). The larger mountain ranges in the area include the Big Horn, Belmont, Vulture, and McDowell Mountains and parts of the Harquahala and Hieroglyphic Mountains. The northern part of the survey area is generally higher in elevation, slightly cooler, and more moist than the southern part. Elevations range from about 1,100 feet on the lower reaches of the Hassayampa River to about 5,000 feet at the crest of the Harquahala Mountains.

The survey area is drained by the Agua Fria, Salt, Verde, and Hassayampa Rivers and their tributaries. Dams control the Agua Fria, Salt, and Verde Rivers. The Agua Fria, Salt, and Hassayampa riverbeds are dry much of the year. Desert washes, which are tributaries of the larger rivers, are dry for most of the year although they carry large amounts of water for short periods following intense rains. Drainage is dominantly toward the south and southwest.

In most of the survey area, the water table is at a depth of about 250 to 550 feet. In the past, ground water was pumped at a rate that surpassed natural recharge. The water table dropped as much as 300 feet in the Phoenix area between 1923 and 1977. This problem will probably become more acute as the population increases.

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 suitablity, 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 rock. 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

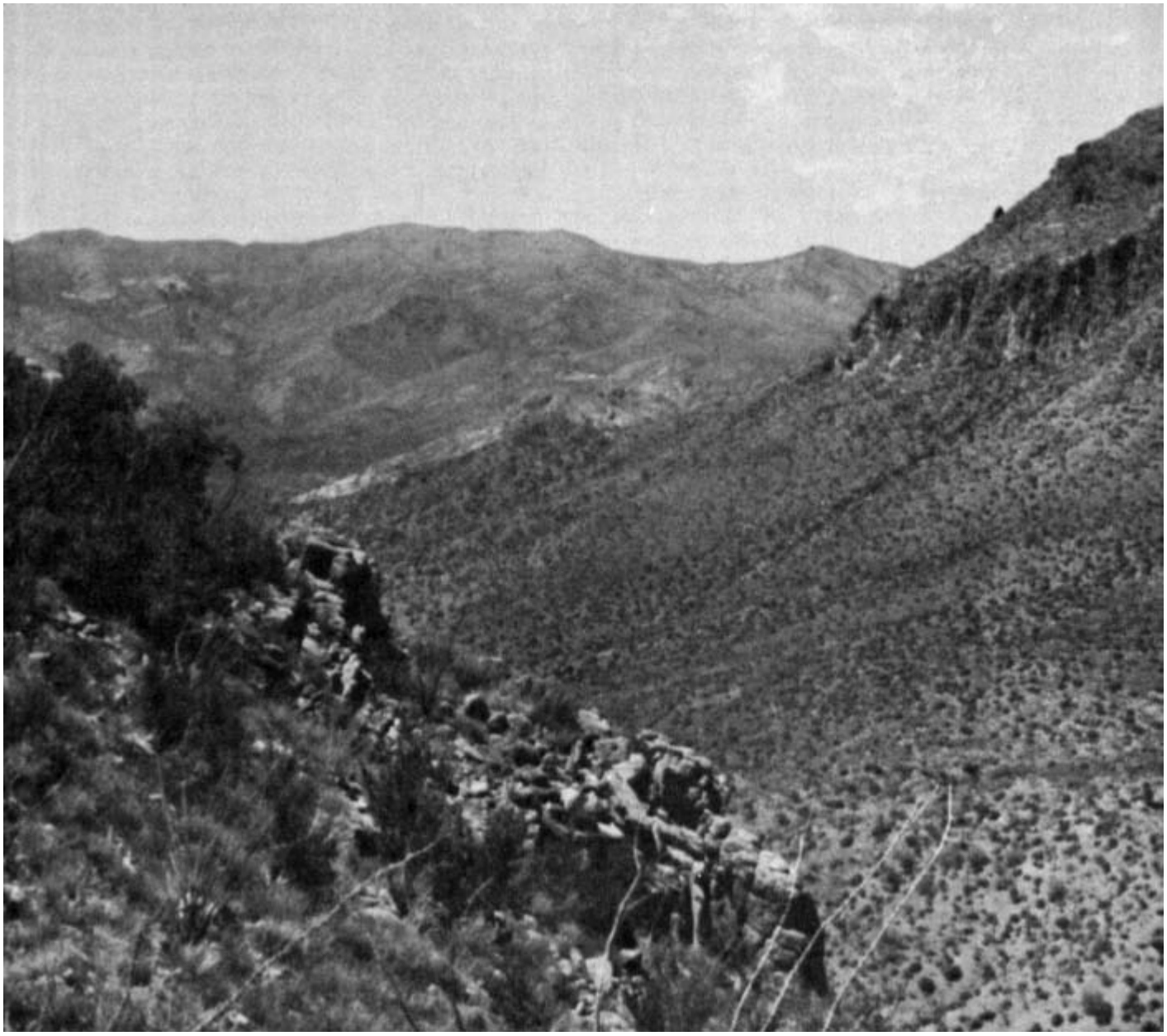

Figure 1.—Typical area of Cellar-Rock outcrop complex, 10 to 70 percent slopes, in the Harquahala Mountains.

and other living organisms and has not been changed by other biologic 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 or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or model as to how they were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge gradually into one another as their characteristics gradually change. To construct an accurate 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 the soil survey was in progress, samples of some of the soils in the area were collected for laboratory analyses and for engineering tests. Soil scientists interpreted 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 were field tested through observation of the soils in different uses and under different levels of management. Some interpretations were modified to fit local conditions, and some new interpretations were developed to meet local needs. Data were 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 were 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 state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

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

Intensity of Mapping

The soils in this survey area were mapped at two levels of detail. The detail of mapping in a given area was selected based on the anticipated long term use of the area.

At the most detailed level, map units are narrowly defined. Soil boundaries are plotted and verified at closely spaced intervals. Agricultural areas in the Aguila area and in the Salt River Pima-Maricopa Indian Community, urban areas, and areas likely to be urbanized in the future were mapped at this level of detail. Narrowly defined map units are suitable for planning intensive soil uses, such as irrigated cropland and urban development.

Most of the survey area, including the part administered by the Bureau of Land Management, is used as rangeland and was mapped at a less detailed level. The map units in this area are broadly defined. Soil boundaries were plotted and verified at widely spaced intervals. In general, these map units are less homogeneous and contain more included areas than the more detailed map units. These units are designed primarily for planning management of large tracts of land as rangeland. They provide general information for more intensive uses, such as cropland and urban development, but the information should be used with caution. Onsite investigation is essential to provide the detail needed for planning intensive land uses.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The soils or miscellaneous areas making up one unit can occur in other units but in a different pattern.

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

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

The general map units in this survey have been grouped into general kinds of landscape for broad interpretive purposes. Each of the broad groups and the map units in each group are described in the following pages. Textures given in the descriptive title of the map units are those of the upper part of the profile.

Deep, very warm soils; on flood plains and alluvial fans

This group consists of two map units. It makes up about 4 percent of this survey area. The soils in this group are nearly level and gently sloping. They are nongravelly and very gravelly, loamy and sandy, and well drained and excessively drained. They are subject to rare or occasional periods of flooding.

This group is used mainly as rangeland. It is also used as irrigated cropland, for urban development, and as a source of sand and gravel.

1. Carrizo

Nearly level and gently sloping, occasionally flooded, very gravelly, sandy soils; on flood plains

This map unit is mainly on the flood plains of the Agua Fria, Hassayampa, Salt, and Verde Rivers. Slope is 0 to 5 percent. Elevation is 1,000 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 1 percent of the survey area. It is about 85 percent Carrizo soils and 15 percent components of minor extent.

Carrizo soils are deep and excessively drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are very gravelly and sandy throughout.

Of minor extent in this unit are Antho, Brios, Gilman, Maripo, and Vint soils.

This unit is used mainly as rangeland. It is also used as a source of sand and gravel.

The main limitation of this unit for use as rangeland is low precipitation.

2. Gilman

Nearly level, rarely flooded, loamy soils; on flood plains and alluvial fans

This map unit is primarily in the Paradise Valley area and southeast of Wittman. Slope is 0 to 3 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 3 percent of the survey area. It is about 92 percent Gilman soils and 8 percent components of minor extent.

Gilman soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are loamy throughout.

Of minor extent in this unit are Carrizo, Antho, Estrella, and Glenbar soils on flood plains and alluvial fans and Denure and Momoli soils on fan terraces.

This unit is used as rangeland, as irrigated cropland, and for urban development.

The main limitation of this unit for use as rangeland is low precipitation. The main limitation for use as irrigated cropland and for urban development is the hazard of flooding.

Deep, very warm soils; on fan terraces

This group consists of four map units. It makes up about 41 percent of this survey area. The soils in this group are dominantly nearly level to moderately steep.

They are nongravelly to very gravelly, clayey to sandy, and well drained and excessively drained.

This group is used mainly as rangeland. It is also used as irrigated cropland and for urban development.

3. Momoli-Carrizo-Denure

Nearly level, nongravelly to very gravelly, loamy and sandy soils; on fan terraces

This map unit is in areas southwest of the Big Horn Mountains, south of the Vulture Mountains, and north of Paradise Valley. Slope is 0 to 3 percent. Elevation is 1,000 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 7 percent of the survey area. It is about 49 percent Momoli soils, 24 percent Carrizo soils, and 18 percent Denure soils. The remaining 9 percent is components of minor extent.

Momoli soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are very gravelly and loamy throughout.

Carrizo soils are deep and excessively drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are very gravelly and sandy throughout.

Denure soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are nongravelly to gravelly and are loamy throughout.

Of minor extent in this unit are Carrizo and Gilman soils on flood plains and Chuckawalla, Gunsight, and Tremant soils on fan terraces.

Most areas of this unit are used as rangeland. A few areas are used for urban development.

The main limitation of this unit for use as rangeland is low precipitation.

4. Mohall-Contine

Nearly level and gently sloping, loamy and clayey soils; on fan terraces

This map unit is north of the White Tank Mountains, on the Salt River Pima-Maricopa Indian Community, and northeast of Williams Air Force Base. Slope is 0 to 8 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 4 percent of the survey area. It is about 61 percent Mohall and similar soils, 36 percent Contine soils, and 3 percent components of minor extent.

Mohall soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer and subsoil are loamy. Below the subsoil to a depth of 60 inches or more the soils are nongravelly to very gravelly, loamy to sandy, and calcareous.

Contine soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is loamy. The subsoil is clayey and is calcareous in the lower part.

Of minor extent in this unit are Denure, Momoli, Pinamt, Tremant, and Rillito soils on fan terraces and Gadsden soils on narrow flood plains.

This unit is used mainly as irrigated cropland and as rangeland. It is also used for urban development.

The main limitation of this unit for use as irrigated cropland is the slow permeability of the Contine soils. The main limitation for use as rangeland is low precipitation. The main limitations for urban development are the shrink-swell potential, the slow permeability of the Contine soils, and the moderately slow permeability of the Mohall soils.

5. Gunsight-Rillito-Chuckawalla

Dominantly gently sloping to moderately steep, gravelly and very gravelly, loamy soils; on fan terraces

This map unit is in the southwestern part of the survey area, on the Hassayampa Plain and north of Tonopah. Slope is 1 to 40 percent, but it is dominantly 1 to 25 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 14 percent of the survey area. It is about 27 percent Gunsight and similar soils, 19 percent Rillito soils, and 8 percent Chuckawalla soils. The remaining 46 percent is components of minor extent.

Gunsight soils are deep, well drained, and calcareous. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are very gravelly and loamy throughout.

Rillito soils are deep, well drained, and calcareous. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are gravelly and loamy throughout.

Chuckawalla soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is loamy and is covered with a desert pavement. The subsoil is very gravelly, loamy, and strongly saline. Below the subsoil to a depth of 60 inches or more the soils are very gravelly, loamy, calcareous, and strongly saline.

Of minor extent in this unit are Denure, Beeline, Cipriano, Mohall, Momoli, Pinamt, and Tremant soils on fan terraces and Carrizo and Gilman soils on flood plains.

This unit is used as rangeland.

The main limitations of this unit for use as rangeland are the high calcium carbonate content of the Gunsight and Rillito soils and the dense desert pavement and salt content of the Chuckawalla soils. The unit is also limited by low precipitation.

6. Tremant-Ebon-Pinamt

Dominantly gently sloping to moderately steep, gravelly and very gravelly, loamy and clayey soils; on fan terraces

This map unit is in the central and southeastern parts of the survey area. Slope is 0 to 40 percent, but it is dominantly 1 to 20 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 16 percent of the survey area. It is about 33 percent Tremant soils, 23 percent Ebon and similar soils, and 14 percent Pinamt soils. The remaining 30 percent is components of minor extent.

Tremant soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer and subsoil are gravelly and loamy. Below the subsoil to a depth of 60 inches or more the soils are gravelly, sandy, and calcareous.

Ebon soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is very gravelly and loamy. The subsoil is very gravelly and clayey. Below the subsoil to a depth of 60 inches or more the soils are gravelly, sandy, and calcareous.

Pinamt soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are very gravelly and loamy throughout. The substratum to a depth of 60 inches or more is calcareous.

Of minor extent in this unit are Cipriano, Contine, Gunsight, Luke, Mohall, and Rillito soils on fan terraces and Carrizo soils on flood plains.

This unit is used as rangeland and for urban development.

The main limitation of this unit for use as rangeland is low precipitation. The main limitations for urban development are the shrink-swell potential of the Tremant soils and the slow permeability of the Ebon soils.

Very shallow, shallow, and deep, very warm soils; on fan terraces

This group consists of one map unit. It makes up about 8 percent of this survey area. The soils in this group are nearly level and gently sloping. They are cobbly and nongravelly to very gravelly, clayey and loamy, and well drained.

Most areas of this group are used as rangeland. A few areas are used for urban development.

7. Cipriano-Suncity-Carefree

Nearly level and gently sloping, cobbly and nongravelly to very gravelly, clayey and loamy soils; on fan terraces

This map unit is primarily in the central part of the survey area. Slope is 0 to 8 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 8 percent of the survey area. It is about 35 percent Cipriano soils, 25 percent Suncity soils, and 20 percent Carefree and similar soils. The remaining 20 percent is components of minor extent.

Cipriano soils are very shallow and shallow over a hardpan, are well drained, and are calcareous. The soils formed in alluvium derived dominantly from acid and basic igneous rock. They are very gravelly and loamy throughout and are underlain by a hardpan at a depth of 4 to 20 inches.

Suncity soils are very shallow and shallow over a hardpan and are well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is gravelly and loamy. The subsoil is nongravelly to gravelly and is loamy. A hardpan is at a depth of 5 to 20 inches.

Carefree soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is cobbly and loamy. The subsoil is clayey. Below the subsoil to a depth of 60 inches or more the soils are extremely cobbly and clayey.

Of minor extent in this unit are Beardsley, Beeline, Ebon, and Sal soils on fan terraces, Gadsden soils on flood plains, and Carrizo soils in drainageways.

Most areas of this unit are used as rangeland. A few areas are used for urban development.

The main limitations of this unit for use as rangeland are the high calcium carbonate content and depth to the hardpan in the Cipriano and Suncity soils and low precipitation. The main limitations for urban development are the depth to the hardpan in the Cipriano and Suncity soils and the shrink-swell potential and slow permeability of the Carefree soils.

Very shallow and shallow, very warm soils, and Rock outcrop; on hill slopes and mountain slopes

This group consists of one map unit. It makes up about 14 percent of this survey area. The soils in this group are dominantly strongly sloping to steep. They are very gravelly, loamy, and well drained.

This group is used as rangeland.

8. Gachado-Rock outcrop-Quilotosa

Dominantly strongly sloping to steep, very gravelly, loamy soils, and Rock outcrop; on hill slopes and mountain slopes

This map unit is primarily in the western and central parts of the survey area. Most of the unit is in the Big Horn, Belmont, White Tank, and Hieroglyphic Mountains. Slope is 1 to 65 percent, but it is dominantly 7 to 65 percent. Elevation is 1,200 to 3,000 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

This unit makes up about 14 percent of the survey area. It is about 34 percent Gachado and similar soils, 23 percent Rock outcrop, and 22 percent Quilotosa and similar soils. The remaining 21 percent is components of minor extent.

Gachado soils are very shallow and shallow and are well drained. They formed in alluvium and colluvium derived dominantly from volcanic rock. The soils are very gravelly and loamy throughout. Unweathered volcanic bedrock is at a depth of 4 to 20 inches.

Rock outcrop consists mainly of areas of exposed volcanic and granitic rock. Some areas of Rock outcrop are nearly vertical escarpments.

Quilotosa soils are very shallow and shallow and are well drained. They formed in alluvium and colluvium derived dominantly from granitic rock. The soils are very gravelly and loamy throughout. Unweathered granitic bedrock is at a depth of 2 to 20 inches.

Of minor extent in this unit are Cherioni, Lomitas, Schenco, and Vaiva soils on hill slopes and mountain slopes; Carrizo soils on flood plains; and Cipriano, Ebon, and Gunsight soils on fan terraces.

This unit is used as rangeland.

The main limitations of this unit for use as rangeland are slope, the areas of Rock outcrop, and low precipitation.

Deep, warm soils; on fan terraces and flood plains

This group consists of two map units. It makes up about 13 percent of this survey area. The soils in this group are dominantly nearly level to moderately steep. They are nongravelly and very gravelly, loamy and clayey, and well drained.

This group is used mainly as rangeland and irrigated cropland. It is also used for urban development.

9. Mohave-Continental-Guest

Nearly level and gently sloping, clayey and loamy soils; on fan terraces and flood plains

This map unit is in the northwestern part of the survey area, in the vicinity of Aguila. Slope is 0 to 8 percent. Elevation is 1,800 to 3,300 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 180 to 270 days.

This unit makes up about 7 percent of the survey area. It is about 44 percent Mohave soils, 23 percent Continental soils, and 17 percent Guest soils. The remaining 16 percent is components of minor extent.

Mohave soils are on fan terraces. These soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer and subsoil are loamy. Below the subsoil to a depth of 60 inches or more the soils are loamy and are calcareous in the lower part.

Continental soils are on fan terraces. These soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is loamy. The subsoil is clayey and is calcareous in the lower part.

Guest soils are on flood plains. These soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are clayey throughout.

Of minor extent in this unit are Eba soils on fan terraces and Anthony, Arizo, and Gila soils on flood plains.

This unit is used as irrigated cropland and as rangeland.

The main limitation of this unit for use as irrigated cropland is the slow permeability of the Continental and Guest soils. The main limitation for use as rangeland is low precipitation.

10. Eba-Pinaleno

Dominantly gently sloping to moderately steep, very gravelly, clayey and loamy soils; on fan terraces

This map unit is in the northwestern and northeastern parts of the survey area, adjacent to mountains. Slope is 0 to 40 percent, but it is dominantly 1 to 20 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

This unit makes up about 6 percent of the survey area. It is about 62 percent Eba soils and 23 percent Pinaleno soils. The remaining 15 percent is components of minor extent.

Eba soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is very gravelly and loamy. The subsoil is very gravelly and clayey. Below the subsoil to a depth of 60 inches or more the soils are very gravelly, loamy, and calcareous.

Pinaleno soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer and subsoil are very gravelly and loamy. Below the subsoil to a depth of 60 inches or more the soils are very gravelly to nongravelly, loamy, and calcareous.

Of minor extent in this unit are Cave, Continental, Greyeagle, Mohave, Nickel, and Tres Hermanos soils on fan terraces and Arizo soils on flood plains.

This unit is used mainly as rangeland. It is also used for urban development.

The main limitation of this unit for use as rangeland is low precipitation. The main limitation for urban development is the slow permeability of the Eba soils.

Very shallow, shallow, and deep, warm soils; on fan terraces

This group consists of one map unit. It makes up about 5 percent of this survey area. The soils in this group are dominantly gently sloping to moderately steep. They are nongravelly and very gravelly, loamy and clayey, and well drained.

Most areas of this group are used as rangeland. A few areas are used for urban development.

11. Greyeagle-Continental-Nickel

Dominantly gently sloping to moderately steep, nongravelly and very gravelly, loamy and clayey soils; on fan terraces

This map unit is in the northwestern part of the survey area. Slope is 0 to 40 percent, but it is dominantly 1 to 30 percent. Elevation is 1,800 to 3,300 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 180 to 270 days.

This unit makes up about 5 percent of the survey area. It is about 33 percent Greyeagle and similar soils, 25 percent Continental and similar soils, and 15 percent Nickel soils. The remaining 27 percent is components of minor extent.

Greyeagle soils are very shallow and shallow, well drained, and calcareous. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are very gravelly and loamy and are underlain by a hardpan at a depth of 4 to 20 inches.

Continental soils are deep and well drained. They formed in alluvium derived dominantly from acid and basic igneous rock. The surface layer is loamy. The subsoil is clayey.

Nickel soils are deep, well drained, and calcareous. They formed in alluvium derived dominantly from acid and basic igneous rock. The soils are very gravelly and loamy throughout.

Of minor extent in this unit are Cave, Eba, Ohaco, and Suncity Variant soils on fan terraces and Arizo soils on flood plains.

Most areas of this unit are used as rangeland. A few areas are used for urban development.

The main limitations of this unit for use as rangeland are the high calcium carbonate content of the Greyeagle and Nickel soils, the depth to the hardpan in the Greyeagle soils, and low precipitation. The main limitations for urban development are the depth to the hardpan in the Greyeagle soils and the shrink-swell potential and slow permeability of the Continental soils. In some areas slope is a limitation.

Very shallow and shallow, warm soils, and Rock outcrop; on hill slopes and mountain slopes

This group consists of one map unit. It makes up about 15 percent of this survey area. The soils in this group are dominantly moderately steep and steep. They are nongravelly and very gravelly, loamy and clayey, and well drained.

This group is used as rangeland.

12. Gran-Rock outcrop-Lehmans

Dominantly moderately steep and steep, nongravelly and very gravelly, loamy and clayey soils, and Rock outcrop; on hill slopes and mountain slopes

This map unit is in the northern part of the survey area, including the Harquahala, Vulture, and McDowell Mountains and part of the Hieroglyphic Mountains. Slope is 1 to 65 percent, but it is dominantly 10 to 65 percent. Elevation is 1,800 to 4,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

This unit makes up about 15 percent of the survey area. It is about 33 percent Gran and similar soils, 27 percent Rock outcrop, and 17 percent Lehmans soils. The remaining 23 percent is components of minor extent.

Gran soils are very shallow and shallow and are well drained. They formed in alluvium and colluvium derived dominantly from granitic rock. The surface layer is very gravelly and loamy. The subsoil is very gravelly and clayey. Weathered granite is at a depth of 10 to 20 inches. Unweathered granitic bedrock is at a depth of 20 to 40 inches.

Rock outcrop consists of areas of exposed volcanic and granitic rock. Some areas of Rock outcrop are nearly vertical escarpments.

Lehmans soils are very shallow and shallow and are well drained. They formed in alluvium and colluvium derived dominantly from volcanic rock. The surface layer is very gravelly and loamy. The subsoil is clayey. Below the subsoil to a depth of about 20 inches the soils are loamy. Unweathered volcanic bedrock is at a depth of 10 to 20 inches.

Of minor extent in this unit are Cellar, Dixaleta, and Wickenburg soils on hill slopes and mountain slopes; Eba, Greyeagle, Nickel, and Pinaleno soils on fan terraces; and Arizo soils on flood plains.

This unit is used as rangeland.

The main limitations of this unit for use as rangeland are slope and the areas of Rock outcrop.

Broad Land Use Considerations

The soils in this survey area vary widely in their potential for major land uses. Most of the land in the survey area is used as rangeland and wildlife habitat.

General soil map unit 1 includes the most productive soils used as rangeland in the survey area. It receives additional water from flooding and runoff. Care must be taken, though, to protect the soils from erosion and the vegetation from overgrazing.

Units 5, 7, and 11 include the least productive soils used as rangeland in the survey area. The high content of lime limits forage production on the Gunsight, Rillito, and Nickel soils. Production is limited on the Cipriano, Suncity, and Greyeagle soils by the high content of lime and shallow depth to a hardpan. Areas of the Chuckawalla soils are almost devoid of vegetation; the main limitations are the dense desert pavement and the high content of toxic salts. The Carefree and Continental soils are more productive than the other soils in these map units. Low precipitation is the most limiting factor on these soils.

Soils in the other general soil map units are moderately productive if used as rangeland. Production throughout the survey area is more dependent on the amount of precipitation than on any other factor.

Approximately 2 percent of the survey area is used as irrigated cropland. Most of the cropland in the survey area is in general map units 4 and 9. The Mohall and Mohave soils are well suited to use as cropland. They have few limitations. The Contine, Continental, and Guest soils are moderately well suited to use as cropland. The main limitation is the content of clay, which restricts permeability.

The areas north of Phoenix and in the vicinity of Scottsdale and Apache Junction are the most rapidly developing parts of the survey area. Most of these areas are in units 2, 6, and 7. Unit 2 is limited mainly by a hazard of flooding. Areas that are protected from flooding are well suited to urban development, but unprotected areas are poorly suited. Map unit 2 is moderately well suited to urban development. It is limited in some areas by steepness of slope. The Tremant soils are limited mainly by a moderate shrink-swell potential. The Ebon soils are limited mainly by slow permeability. The Pinamt soils have few limitations. Map unit 7 is poorly suited to urban development. The main limitations are shallow depth to the hardpan in the Cipriano and Suncity soils and the high shrink-swell potential of the Carefree soils.

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 on each map unit is given under "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 behavior 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 segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in 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*. Some 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, Contine clay loam is one of several phases in the Contine series.

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Gunsight-Rillito complex, 1 to 25 percent slopes, is an example.

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

miscellaneous areas are somewhat similar. Luke-Cipriano association, 1 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. Rock outcrop is an example.

Table 4 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

1—Antho sandy loams. These deep and well drained soils are on alluvial fans. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 1,700 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 55 percent in this unit is Antho sandy loam that is noncalcareous in the surface layer and is calcareous below, and 25 percent is Antho sandy loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo, Gilman, and Maripo soils on flood plains and Denure and Momoli soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Typically, the surface layer of these Antho soils is brown sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown sandy loam. In some areas these soils are affected by salts and sodium.

Permeability of these Antho soils is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, these soils are subject to rare periods of flooding.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

In areas where the soils in this unit are noncalcareous in the surface layer, they have high potential for producing forage and respond well to rangeland management. Where the range is in good or excellant condition, it produces forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

In areas where these soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few small areas in the Hassayampa Plain area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the hazard of flooding. These soils are subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on this unit should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

If the soils in this unit are used for septic tank absorption fields, the main limitation is the hazard of flooding. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Antho sandy loam that is noncalcareous in the surface layer is in the Sandy Loam Upland, 7- to 10-inch p.z., range site, and the Antho sandy loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site.

2—Antho gravelly sandy loams. These deep and well drained soils are on alluvial fans. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 1,700 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 55 percent of the soil in this unit is Antho gravelly sandy loam that is noncalcareous in the surface layer and is calcareous below the surface layer, and 25 percent is Antho gravelly sandy loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils in drainageways, Gilman and Maripo soils on flood plains, and Denure and Momoli soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Typically, the surface layer of these Antho soils is brown gravelly sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is

stratified, light brown sandy loam and gravelly sandy loam.

Permeability of these Antho soils is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, these soils are subject to rare periods of flooding.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

In areas where these soils are noncalcareous in the surface layer, they have high potential for producing forage and respond well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

In areas where these soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few small areas in the Hassayampa Plain area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the hazard of flooding. This unit is subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on this unit should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

If the soils in this unit are used for septic tank absorption fields, the main limitation is the hazard of flooding. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Antho gravelly sandy loam that is noncalcareous in the surface layer is in the Sandy Loam Upland, 7- to 10-inch p.z., range site, and the Antho gravelly sandy loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site.

3—Antho-Carrizo-Maripo complex. This map unit is on flood plains and in drainageways. Slope is 0 to 3 percent. Elevation is 1,100 to 2,100 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 35 percent Antho sandy loam, 30 percent Carrizo very gravelly sand, and 20 percent Maripo sandy loam. The Antho and Maripo soils are on flood plains, and the Carrizo soil is in narrow, meandering drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Brios soils in drainageways, Gilman and Vint soils on flood plains, and Denure, Momoli, and Carrizo soils on stream terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Antho soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, slightly calcareous sandy loam. In some areas the soil is gravelly throughout.

Permeability of the Antho soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate. Where unprotected, this soil is subject to rare periods of flooding.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the soil is pinkish gray, calcareous very gravelly sand and very gravelly coarse sand to a depth of 60 inches or more.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

The Maripo soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 18 inches thick. The upper 11 inches of the underlying material is light brown, calcareous sandy loam, and the lower part to a depth of 60 inches or more is light brown, calcareous very gravelly loamy sand. Depth to very gravelly loamy sand ranges from 20 to 36 inches.

Permeability of this Maripo soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate. Where unprotected, this soil is subject to rare periods of flooding.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The Antho and Maripo soils have moderate potential for producing forage. They respond well to rangeland management. Where the range is in good or excellent condition, the soils produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover. In a few areas these soils are calcareous in the surface layer and are therefore less productive than in most other areas of the unit.

The Carrizo soil is one of the most productive rangeland soils in the survey area. It receives extra moisture from runoff, which increases production. The soil responds well to rangeland management. Extra care in management is needed to protect the soil from gullying and channeling. This soil can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this soil are overgrazed.

The riparian habitat in some areas of the Carrizo soil is extremely important to wildlife.

The soils in this unit are severely limited for urban use because they are in drainageways and on flood plains that are subject to flooding.

This map unit is in capability subclass VIIw, nonirrigated. The Antho and Maripo soils are in the Sandy Loam Upland, 7- to 10-inch p.z., range site, and the Carrizo soil is in the Sandy Bottom, 7- to 10-inch p.z., range site.

4—Antho-Carrizo-Maripo complex, low precipitation. This map unit is on flood plains and in drainageways. Slope is 0 to 3 percent. Elevation is 1,100 to 2,100 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 35 percent Antho sandy loam, 30 percent Carrizo very gravelly sand, and 20 percent Maripo sandy loam. The Antho and Maripo soils are on flood plains, and the Carrizo soil is in narrow, meandering drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Brios soils in drainageways, Gilman and Vint soils on flood plains, and Denure, Momoli, and Carrizo soils on stream terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Antho soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, slightly calcareous sandy loam. In some areas the soil is calcareous throughout.

Permeability of the Antho soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate. Where unprotected, this soil is subject to rare periods of flooding.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the soil is pinkish gray, calcareous very gravelly sand and very gravelly coarse sand to a depth of 60 inches or more.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

The Maripo soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 18 inches thick. The upper 11 inches of the underlying material is light brown, calcareous sandy loam, and the lower part to a depth of 60 inches or more is light brown, calcareous very gravelly loamy sand. Depth to very gravelly loamy sand ranges from 20 to 36 inches.

Permeability of the Maripo soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate. Where unprotected, this soil is subject to rare periods of flooding.

This unit is used as rangeland and wildlife habitat.

The Antho and Maripo soils have low potential for producing forage. They respond well to rangeland management. Where the range is in good or excellent condition, the soils produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover. In a few areas these soils are calcareous in the surface layer and are therefore less productive than in most other areas of the unit.

The Carrizo soil is one of the most productive rangeland soils in the survey area. It receives extra moisture from runoff, which increases production. The soil responds well to rangeland management. Extra care in management is needed to protect the soil from gullying and channeling. This soil can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this soil are overgrazed.

The riparian habitat in some areas of the Carrizo soil is extremely important to wildlife.

This map unit is in capability subclass VIIw, nonirrigated. The Antho and Maripo soils are in the Sandy Loam Upland, 2- to 7-inch p.z., range site, and the Carrizo soil is in the Sandy Bottom, 2- to 7-inch p.z., range site.

5—Anthony sandy loam. This deep and well drained soil is on flood plains and alluvial fans. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is light brown sandy loam about 2 inches thick. The upper 38 inches of the underlying material is light brown and brown, calcareous gravelly sandy loam, and the lower part to a depth of 60 inches or more is light reddish brown, calcareous loam. In some areas this soil is noncalcareous to a depth of 10 inches or more, and in some areas the soil is affected by salts and sodium.

Included in this unit are small areas of Gila and Arizo soils. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Anthony soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, this soil is subject to rare periods of flooding.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used as irrigated cropland.

This unit has moderate potential for producing forage. It responds well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover. In some areas of this unit, the soil is calcareous in the surface layer and is therefore less productive than in most other areas of the unit.

If this unit is used as irrigated cropland, the main limitation is the moderate available water capacity. The soil in this unit generally is droughty in areas where it is surrounded by soils that have a higher available water capacity.

If feasible, irrigation systems should be designed to irrigate this soil separately from adjacent soils that have a lower water intake rate. Light and frequent applications of water are necessary. In the more sloping areas, irrigation streams can cause erosion. Erosion can be minimized by irrigating across the slope or by leveling the soil. Generally, leveling cuts can be made to a depth of about 40 inches without exposing unfavorable soil material. An onsite investigation is advisable, however, before irrigation systems are planned and leveling cuts are made.

Lining irrigation ditches with concrete reduces loss of water by seepage. Applying manure or cotton gin trash or plowing under crop residue or green manure crops increases the available water capacity and improves tilth. Fertilizer containing nitrogen should be applied in several light applications because it is readily leached below the root zone.

This map unit is in capability subclasses IIs, irrigated, and VIIs, nonirrigated. It is in the Sandy Loam Upland, 8- to 10-inch p.z., range site.

6—Anthony-Arizo complex. This map unit is on flood plains and in drainageways. Slope is 0 to 3 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 40 percent Anthony sandy loam and 40 percent Arizo gravelly sandy loam. The Anthony soil is on flood plains adjacent to drainageways, and the Arizo soil is in drainageways. The components of this unit are so intricately intermingled that it was not pracitical to map them separately at the scale used.

Included in this unit are small areas of sandy soils that are similar to the Arizo soil but are nongravelly. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Anthony soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 2 inches thick. The upper 38 inches of the underlying material is light brown and brown, calcareous gravelly sandy loam, and the lower part to a depth of 60 inches or more is light reddish brown, calcareous loam. In some areas this soil is noncalcareous to a depth of 10 inches or more.

Permeability of the Anthony soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate. Where unprotected, this soil is subject to rare periods of flooding.

The Arizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink gravelly sandy loam about 1 inch thick. The upper 7 inches of the underlying material is light brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is reddish yellow and pink, calcareous very gravelly loamy sand.

Permeability of the Arizo soil is very rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is severe. Where unprotected, this soil is

subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

This unit is used as rangeland and wildlife habitat.

The Anthony soil has moderate potential for producing forage. It responds well to rangeland management. This soil can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover. In a few areas this soil is calcareous in the surface layer and is therefore less productive than in most other areas of the soil.

The Arizo soil is one of the most productive rangeland soils in the survey area. It receives extra moisture from runoff, which increases production. The soil responds well to rangeland management. Extra care in management is needed to protect the soil from gullying and channeling. This soil can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this soil are overgrazed.

The riparian habitat in some areas of the Arizo soil is extremely important to wildlife.

This map unit is in capability subclass VIIw, nonirrigated. The Anthony soil is in the Sandy Loam Upland, 10- to 12-inch p.z., range site, and the Arizo soil is in the Sandy Bottom, 10- to 12-inch p.z., range site.

7—Anthony-Arizo complex, low precipitation. This map unit is on flood plains and in drainageways. Slope is 0 to 3 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 40 percent Anthony sandy loam and 40 percent Arizo gravelly sandy loam. The Anthony soil is on flood plains adjacent to drainageways, and the Arizo soil is in drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of sandy soils that are similar to the Arizo soil but are nongravelly. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Anthony soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 2 inches thick. The upper 38 inches of the underlying material is light brown and brown, calcareous gravelly sandy loam, and the lower part to a depth of 60 inches or more is light reddish brown, calcareous loam. In some areas this soil is noncalcareous to a depth of 10 inches or more.

Permeability of the Anthony soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate. Where unprotected, this soil is subject to rare periods of flooding.

The Arizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink gravelly sandy loam about 1 inch thick. The upper 7 inches of the underlying material is light brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is reddish yellow and pink, calcareous very gravelly loamy sand.

Permeability of the Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

The Anthony soil has moderate potential for producing forage. It responds well to rangeland management. This soil can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover. In a few areas this soil is calcareous in the surface layer and is therefore less productive than in most other areas of the soil.

The Arizo soil is one of the most productive rangeland soils in the survey area. It receives extra moisture from runoff, which increases production. The soil responds well to rangeland management. Extra care in management is needed to protect the soil from gullying and channeling. This soil can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this soil are overgrazed.

The riparian habitat in some areas of the Arizo soil is extremely important to wildlife.

The soils in this unit are severely limited for urban use because they are in drainageways and on flood plains that are subject to flooding.

This map unit is in capability subclass VIIw, nonirrigated. The Anthony soil is in the Sandy Loam Upland, 8- to 10-inch p.z., range site, and the Arizo soil is in the Sandy Bottom, 8- to 10-inch p.z., range site.

8—Arizo cobbly sandy loam. This deep and excessively drained soil is on flood plains. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is mainly 0 to 3 percent, but in some areas it ranges to 10 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is pink cobbly sandy loam about 1 inch thick. The upper 7 inches of the underlying material is light brown very cobbly sandy loam, and the lower part to a depth of 60 inches or more is reddish yellow and pink, calcareous very cobbly loamy sand.

Included in this unit are small areas of variable, stratified sediment recently deposited by intermittent streams. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

This unit is used as rangeland and wildlife habitat.

The soil in this unit is one of the most productive rangeland soils in the survey area. It receives extra moisture from runoff, which increases production. The soil responds well to rangeland management. Extra care in management is needed to protect the soil from gullying and channeling. This unit can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this unit are overgrazed.

The riparian habitat in some areas of this unit is extremely important to wildlife.

A few small areas of this unit in the northwestern part of the survey area receive less precipitation than is typical for the unit. These areas are somewhat less productive than are most other areas of the unit.

This map unit is in capability subclass VIIw, nonirrigated. It is in the Sandy Bottom, 10- to 12-inch p.z., range site.

9—Beeline-Cipriano complex, 3 to 45 percent slopes. This map unit is on fan terraces. The Beeline soil has slopes of 3 to 45 percent, and the Cipriano soil has slopes of 3 to 25 percent. Elevation is 1,300 to 1,700 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 70 percent Beeline very gravelly sandy loam and 15 percent Cipriano very gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Ebon and Luke soils on flat terrace tops, Gunsight and Rillito soils intermingled with the Beeline and Cipriano soils, and Antho and Carrizo soils in drainageways. Also included are small areas where cemented, sandy conglomerate or a hardpan is exposed. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Beeline soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock deposited over strongly cemented, sandy conglomerate. Typically, the surface layer is light reddish brown, calcareous very gravelly sandy loam about 1 inch thick. The next layer is light reddish brown and pink, calcareous sandy loam about 8 inches thick. The underlying material to a depth of 60 inches or more is pink, strongly cemented, sandy conglomerate. Depth to conglomerate ranges from 5 to 20 inches.

Permeability of the Beeline soil is moderately rapid above the cemented, sandy conglomerate and slow through it. Available water capacity is very low. Effective rooting depth is 5 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the Cipriano soil is light brown, calcareous very gravelly loam about 6 inches deep over a lime-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The Beeline and Cipriano soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the very low available water capacity contribute to the low productivity of the soils. The included soils in drainageways are much more productive than the other soils in the unit. Management of this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 7- to 10-inch p.z., range site.

10—Brios-Carrizo complex, 1 to 5 percent slopes. This map unit is on flood plains, in drainageways of the Agua Fria River, and in the larger desert drainageways (fig. 2). Elevation is 1,000 to 2,100 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Brios loamy sand and 40 percent Carrizo very gravelly sand. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Antho, Gilman, Maripo, and Vint soils on slightly higher benches adjacent to the main drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Figure 2.—An area of Brios-Carrizo complex, 1 to 5 percent slopes, in a drainageway. The steeper areas are Gachado-Lomitas-Rock outcrop complex, 7 to 55 percent slopes.

The Brios soil is deep and somewhat excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pale brown loamy sand about 2 inches thick. The underlying material to a depth of 60 inches or more is pinkish gray and pale brown, stratified fine sandy loam, sand, and gravelly coarse sand. This soil is calcareous below a depth of 21 inches.

Permeability of the Brios soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the soil is pinkish gray, calcareous very gravelly sand and very gravelly coarse sand to a depth of 60 inches or more.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

This unit is used as rangeland and wildlife habitat.

The soils in this unit are among the most productive rangeland soils in the survey area. They receive extra moisture from runoff, which increases production. The soils respond well to rangeland management. Extra care in management is needed to protect the soils from gullying and channeling. These soils can produce forage year round, and they are easily traversed by cattle. Because of the availability of water, ease of access, and

abundance of feed, areas of these soils are often overgrazed.

The riparian habitat in some areas of this unit is extremely important to wildlife.

This map unit is in capability subclass VIIw, nonirrigated. It is in the Sandy Bottom, 7- to 10-inch p.z., range site.

11—Brios-Carrizo complex, low precipitation, 1 to 5 percent slopes. This map unit is on flood plains, in drainageways of the Hassayampa River, and in the larger desert drainageways. Elevation is 1,000 to 2,100 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Brios loamy sand and 40 percent Carrizo very gravelly sand. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Antho, Gilman, Maripo, and Vint soils on slightly higher benches adjacent to the main drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Brios soil is deep and somewhat excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pale brown loamy sand about 2 inches thick. The underlying material to a depth of 60 inches or more is pinkish gray and pale brown sand and gravelly coarse sand. This soil is calcareous below a depth of 21 inches.

Permeability of the Brios soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the soil is pinkish gray, calcareous very gravelly sand and very gravelly coarse sand to a depth of 60 inches or more.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe. Where unprotected, this soil is subject to occasional periods of flooding. Channeling, deposition, and streambank erosion occur during periods of flooding.

This unit is used as rangeland and wildlife habitat.

The soils in this unit are among the most productive rangeland soils in the area. They receive extra moisture from runoff, which increases production. The soils respond well to rangeland management. Extra care in management is needed to protect the soils from gullying and channeling. These soils can produce forage year round, and they are easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, areas of these soils are often overgrazed.

The riparian habitat in some areas of this unit is extremely important to wildlife.

This map unit is in capability subclass VIIw, nonirrigated. It is in the Sandy Bottom, 2- to 7-inch p.z., range site.

12—Carefree cobbly clay loam, 1 to 8 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is pink, calcareous cobbly clay loam about 1 inch thick. The subsoil is light reddish brown, calcareous clay about 49 inches thick over light brown, calcareous very cobbly clay that extends to a depth of 60 inches or more.

Included in this unit are small areas of Beardsley, Contine, Ebon, and Suncity soils on fan terraces and Gadsden soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Carefree soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

This unit has moderate to high potential for producing forage. It responds well to rangeland management. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and therefore should be used during the growing season. Fencing and developing watering facilities help to control grazing.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent the shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential. In addition, more reinforcement can be provided.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the

absorption field and by backfilling excavations with gravelly or sandy material. Poorly designed septic tank absorption fields can seriously compound the effects of shrinking and swelling if foundations are close to the absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clayey Upland, 7- to 10-inch p.z., range site.

13—Carefree-Beardsley complex. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 50 percent Carefree cobbly clay and 40 percent Beardsley cobbly clay loam. The Carefree soil is dominantly in slightly concave areas, and the Beardsley soil is in slightly convex areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Antho and Carrizo soils on flood plains and Contine, Ebon, and Suncity soils on fan terraces. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Carefree soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink cobbly clay about 1 inch thick. The subsoil is light reddish brown, calcareous clay about 49 inches thick. The substratum to a depth of 60 inches or more is light brown, calcareous very cobbly clay.

Permeability of the Carefree soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Beardsley soil is moderately deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish brown cobbly clay loam about 2 inches thick. The subsoil is reddish brown clay about 34 inches thick. A silica-cemented hardpan is at a depth of 36 inches.

Permeability of the Beardsley soil is slow. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

This unit has moderate potential for producing forage. It responds well to rangeland management. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season. Fencing and developing watering facilities help to control grazing.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the shrink-swell potential, and in the Beardsley soil, the depth to hardpan. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential. In addition, more reinforcement can be provided. The limited depth to the hardpan interferes with excavation, and ripping the pan may be necessary.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the slow permeability and, in the Beardsley soil, the depth to the hardpan. The limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. The hardpan restricts the movement of effluent. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable soils in adjacent areas or installing community sewage systems. Poorly designed septic tank absorption fields can seriously compound the effects of shrinking and swelling if foundations are close to the absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clayey Upland, 7- to 10-inch p.z., range site.

14—Carrizo very gravelly sand. This deep and excessively drained soil is on flood plains and alluvial fans. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 1,400 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is pinkish gray, calcareous very gravelly sand about 1 inch thick. The underlying material to a depth of 60 inches or more is pinkish gray, calcareous very gravelly sand and very gravelly coarse sand.

Included in this unit are small areas of Antho, Brios, and Maripo soils in positions similar to those of the Carrizo soil. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, this soil is subject to rare periods of flooding.

This unit is used as rangeland and wildlife habitat.

The soil in this unit is one of the most productive rangeland soils in the survey area. It responds well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit outside the Hassayampa Plain area receive more precipitation than is typical for the unit. These areas are somewhat more productive than most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Sandy Upland, 2- to 7-inch p.z., range site.

15—Carrizo-Gunsight complex, 1 to 5 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 50 percent Carrizo gravelly sandy loam and 30 percent Gunsight very gravelly sandy loam. The Carrizo soil is on broad fan terraces between areas of the Gunsight soil, and the Gunsight soil is on ridgetops and side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Brios and Carrizo soils in drainageways and Denure, Cipriano, Chuckawalla, Momoli, Pinamt, and Rillito soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light yellowish brown gravelly sandy loam about 1 inch thick. The subsurface layer is brown gravelly sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is light brown, brown, and strong brown very gravelly sand and very gravelly coarse sand.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 1 inch of the surface layer is light brown, calcareous very gravelly sandy loam and the lower 9 inches is light brown, calcareous very gravelly sandy loam. The underlying material to a depth of 45 inches is pinkish white, weakly cemented or strongly cemented, calcareous very gravelly sandy loam. Below this to a depth of 60 inches or more is yellowish red gravelly sandy clay loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Carrizo soil has high potential for producing forage. It responds well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In a few areas this soil is calcareous in the surface layer and is therefore less productive than in most other areas of the soil.

The Gunsight soil is among the least productive rangeland soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil.

This map unit is in capability subclass VIIs, nonirrigated. The Carrizo soil is in the Sandy Loam Upland, 2- to 7-inch p.z., range site, and the Gunsight soil is in the Limy Upland, 2- to 7-inch p.z., range site.

16—Cellar-Rock outcrop, 10 to 70 percent slopes. This map unit is on hill slopes and mountain slopes. Elevation is 3,000 to 5,400 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 63 to 67 degrees F.

This unit is about 65 percent Cellar very gravelly fine sandy loam and 15 percent Rock outcrop. The Cellar soil is on hill slopes and mountain slopes, and the Rock outcrop is scattered throughout the unit. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Nickel and Eba soils on the lower side slopes and Arizo soils in drainageways. Also included are small areas of exposed calcareous volcanic ash and dark colored, medium textured, noncalcareous soils on summits. The annual precipitation in areas of these soils is as much as 16 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Cellar soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from granite and gneis. Typically, the surface

layer is brown very gravelly fine sandy loam about 2 inches thick. The upper 1 inch of the underlying material is strong brown very gravelly fine sandy loam, and the lower part to a depth of 12 inches is strong brown, partially weathered granite. Unweathered granite is at a depth of 12 inches. Depth to bedrock ranges from 2 to 14 inches.

Permeability of the Cellar soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 2 to 14 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of granite and gneiss.

This unit is used as rangeland and wildlife habitat.

This unit has high potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. In a few areas the soil in this unit is calcareous in the surface layer and is therefore less productive than in most other areas of the unit.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Granitic Hills, 10- to 12-inch p.z., range site.

17—Cellar-Rock outcrop, low precipitation, 10 to 70 percent slopes. This map unit is on hill slopes and mountain slopes. Elevation is 2,000 to 3,000 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 66 to 70 degrees F.

This unit is about 65 percent Cellar very gravelly fine sandy loam and 15 percent Rock outcrop. The Cellar soil is on hill slopes and mountain slopes, and the Rock outcrop is scattered throughout the unit. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Nickel and Eba soils on the lower side slopes and Arizo soils in drainageways. Also included are small areas of exposed calcareous volcanic ash. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Cellar soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from granite and gneiss. Typically, the surface layer is brown very gravelly fine sandy loam about 2 inches thick. The upper 1 inch of the underlying material is strong brown very gravelly fine sandy loam, and the lower part to a depth of 12 inches is strong brown, partially weathered granite. Unweathered granite is at a depth of 12 inches. Depth to bedrock ranges from 2 to 14 inches.

Permeability of the Cellar soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 2 to 14 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of granite and gneiss.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. In a few areas of this unit, particularly at lower elevations, the soil is calcareous in the surface layer and is therefore less productive than in most other areas of the unit.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Granitic Hills, 8- to 10-inch p.z., range site.

18—Cherioni-Rock outcrop complex, 5 to 60 percent slopes. This map unit is on hills and mountain slopes. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 60 percent Cherioni extremely stony loam and 15 percent Rock outcrop. The Cherioni soil is on hill slopes, hilltops, and mountain slopes, and the Rock outcrop is scattered throughout the unit (fig. 3). The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Cipriano, Gachado, Gunsight, and Suncity soils on lower side slopes. Also included are small areas of exposed calcareous volcanic ash and very shallow, noncalcareous soils. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Cherioni soil is very shallow and shallow and is well drained. It formed in material derived dominantly from basalt. Typically, 70 to 90 percent of the surface is covered with stones and 30 to 60 percent is covered with pebbles and pan fragments. The surface layer is light yellowish brown, calcareous extremely stony loam about 1 inch thick. The underlying material is reddish yellow, calcareous extremely gravelly loam about 9 inches thick over a light brown, silica- and lime-cemented hardpan at a depth of about 10 inches. Basalt is at a depth of about 13 inches. Depth to the hardpan

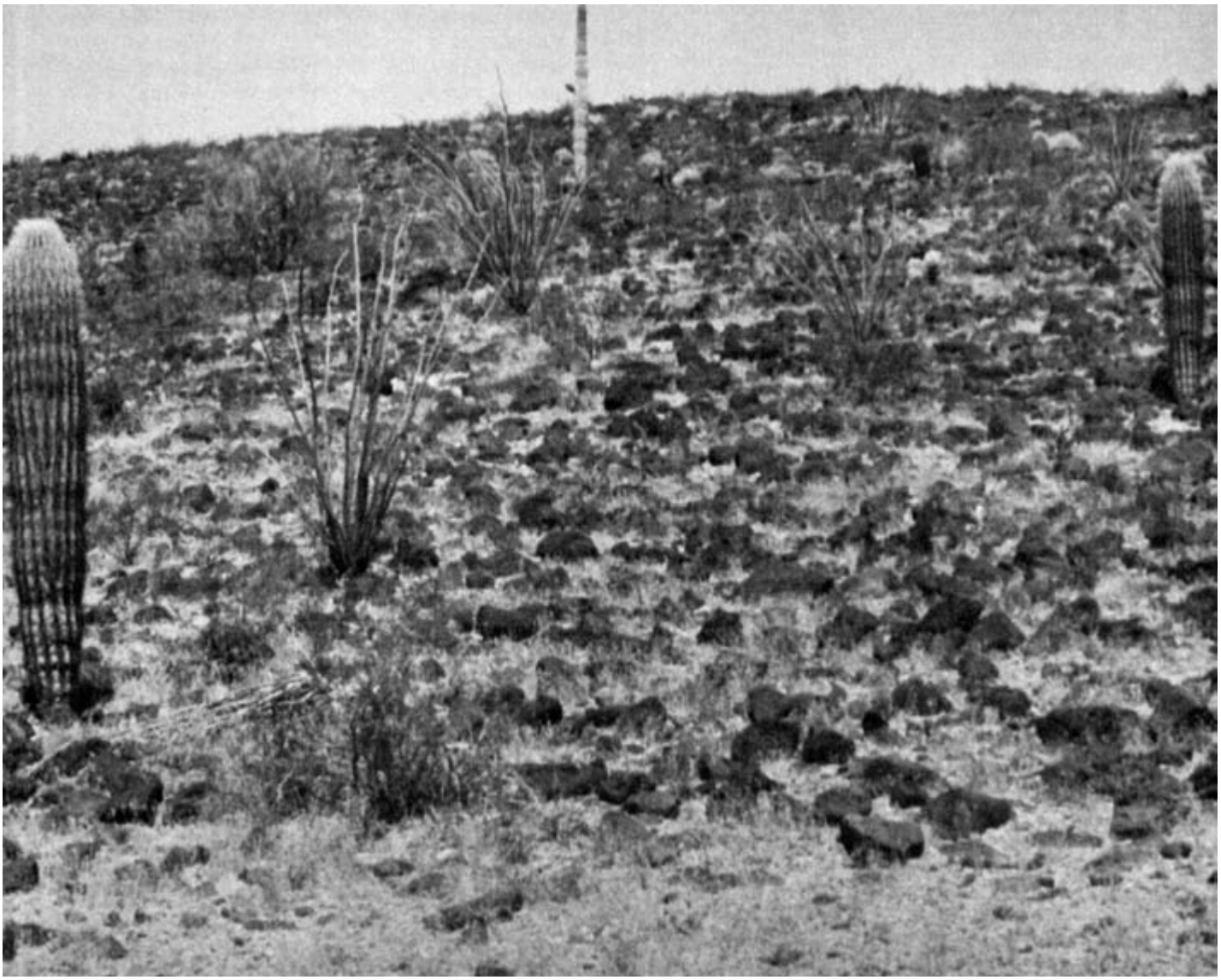

Figure 3.—An area of Cherioni-Rock outcrop complex, 5 to 60 percent slopes. The areas of Cherioni extremely stony loam make traverse by livestock difficult.

ranges from 2 to 20 inches. Depth to bedrock ranges from 4 to 36 inches.

Permeability of the Cherioni soil is moderate. Available water capacity is very low. Effective rooting depth is 2 to 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of basalt.

This unit is used as rangeland and wildlife habitat. A few areas are used for urban development.

The soil in this unit is one of the least productive rangeland soils in the mountainous parts of the survey area. It has moderate potential for producing forage. It responds slowly to rangeland management. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock.

A few small areas of this unit on the Flatiron and Hot Rock Mountains receive less precipitation than is typical for the unit. These areas are somewhat less productive than are most other areas of the unit.

If the soil in this unit is used as sites for buildings or roads, the main limitations are the depth to the cemented hardpan and to bedrock, the slope, and the

content of large stones. The cuts needed to provide nearly level building sites or roadbeds can expose the hardpan and bedrock, which are difficult to excavate. Ripping or blasting, or both, may be necessary. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building site. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the depth to the cemented hardpan and to bedrock, the slope, and the content of large stones. Septic tank absorption fields may not operate properly in some areas of this unit. The depth to the hardpan and to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Steepness of slope makes it difficult to control the distribution of effluent. Effluent can move along the surface of the bedrock and seep to the surface downslope, creating a hazard to health. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Basalt Hills, 7- to 10-inch p.z., range site.

19—Chuckawalla-Gunsight complex, 1 to 8 percent slopes. This map unit is on fan terraces. The Chuckawalla soil has slopes of 1 to 3 percent, and the Gunsight soil has slopes of 1 to 8 percent. Elevation is 1,200 to 1,600 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Chuckawalla extremely gravelly loam and 35 percent Gunsight very gravelly loam. The Chuckawalla soil is on the tops of fan terraces, and the Gunsight soil is on the sides of fan terraces. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Sal, Pinamt, and Tremant soils in areas of fan terraces that do not have a desert pavement; Rillito soils on side slopes; and Antho, Gilman, and Maripo soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Chuckawalla soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, 85 to 95 percent of the surface is covered with varnished desert pavement. The surface layer is light brown extremely gravelly loam about 2 inches thick. The upper 4 inches of the subsoil is light brown, calcareous very gravelly sandy clay loam, and the lower 8 inches is yellowish red, saline extremely gravelly sandy clay loam. The substratum to a depth of 60 inches or more is white, calcareous extremely gravelly sandy loam.

Permeability of the Chuckawalla soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is slight.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, calcareous very gravelly loam and pinkish gray very gravelly sandy loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat.

The soils in this unit are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this unit. The included Antho, Gilman, and Maripo soils on flood plains are much more productive than the other soils in the unit. Management of this unit should therefore be concentrated on these included soils because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. The Chuckawalla soil is in the Saline Upland (Loamy), 7- to 10-inch p.z., range site, and the Gunsight soil is in the Limy Upland, 7- to 10-inch p.z., range site.

20—Chuckawalla-Gunsight complex, low precipitation, 1 to 8 percent slopes. This map unit is on fan terraces. The Chuckawalla soil has slopes of 1 to 3 percent, and the Gunsight soil has slopes of 1 to 8 percent. Elevation is 1,200 to 1,600 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Chuckawalla extremely gravelly loam and 35 percent Gunsight very gravelly loam (fig. 4). The Chuckawalla soil is on the tops of fan terraces, and the Gunsight soil is on the sides of fan terraces. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

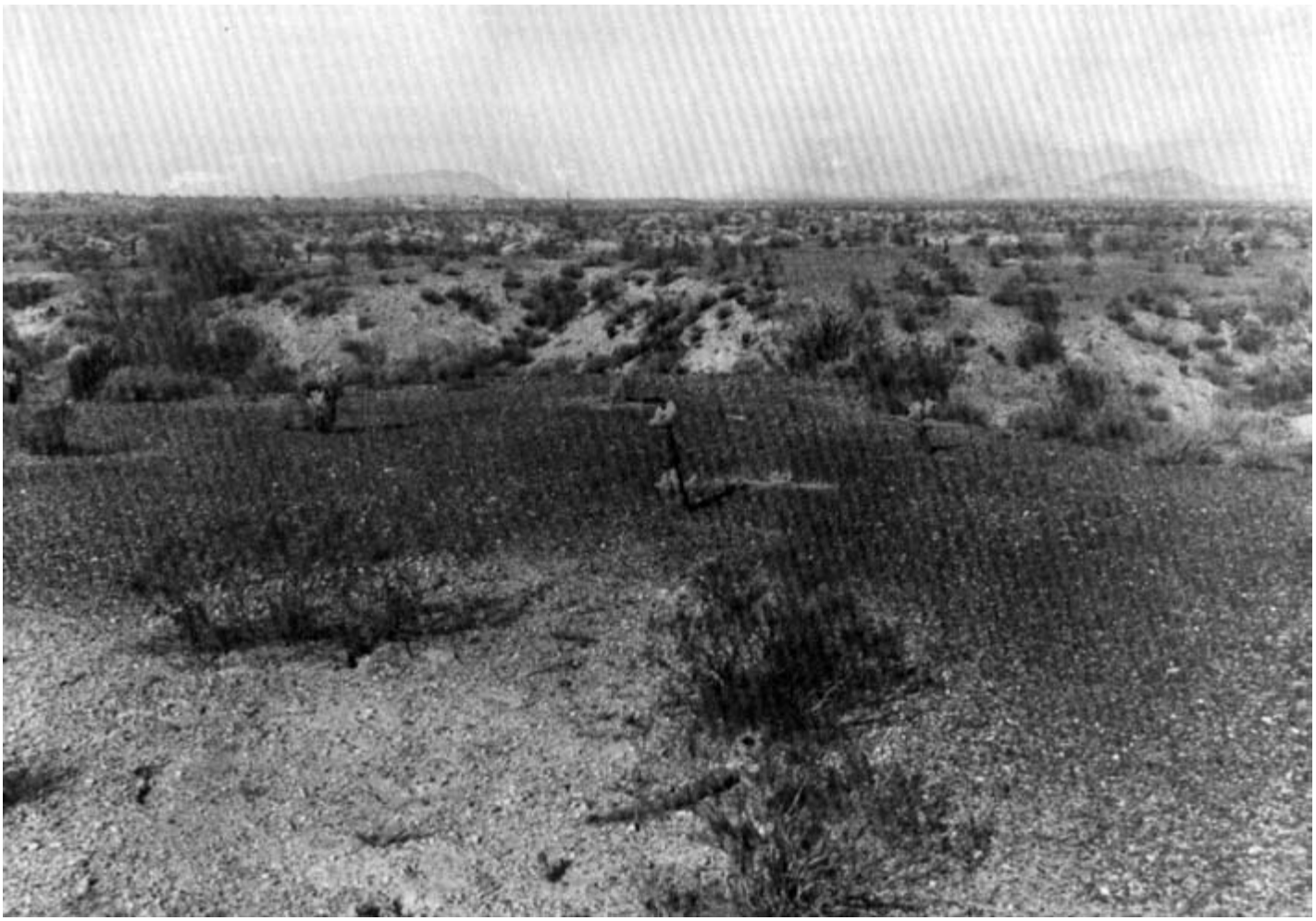

Figure 4.—Typical area of Chuckawalla-Gunsight complex, low precipitation, 1 to 8 percent slopes. A desert pavement is on the Chuckawalla soil. Most of the vegetation is produced on the Gunsight soil.

Included in this unit are small areas of Sal, Pinamt, and Tremant soils in areas of fan terraces that do not have a desert pavement; Rillito soils on side slopes; and Antho, Gilman, and Maripo soils on flood plains. Also included are small areas of soils, adjacent to the Hassayampa River, that have slopes of as much as 45 percent. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Chuckawalla soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, 85 to 95 percent of the surface is covered with varnished desert pavement. The surface layer is light brown extremely gravelly loam about 2 inches thick. The upper 4 inches of the subsoil is light brown, calcareous very gravelly sandy clay loam, and the lower 8 inches is yellowish red, saline extremely gravelly sandy clay loam. The substratum to a depth of 60 inches or more is white, calcareous extremely gravelly sandy loam.

Permeability of the Chuckawalla soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is slight.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, calcareous very gravelly loam and pinkish gray very gravelly sandy loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat.

The soils in this unit are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this unit. The included Antho, Gilman, and Maripo soils on flood plains are much more productive than the other soils in the unit. Management of this unit should therefore be concentrated on these included soils because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. The Chuckawalla soil is in the Saline Upland (Loamy), 2- to 7-inch p.z., range site, and the Gunsight soil is in the Limy Upland, 2- to 7-inch p.z., range site.

21—Cipriano very gravelly loam. This very shallow and shallow, well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is light brown, calcareous very gravelly loam about 1 inch thick. The underlying material is light brown, calcareous very gravelly loam about 5 inches thick over a light brown and pinkish gray, silica- and lime-cemented hardpan. In a few areas the soil is slightly less gravelly than is typical. Depth to the hardpan ranges from 4 to 20 inches.

Included in this unit are small areas of Cherioni soils on low hills, Gunsight and Suncity soils on fan terraces, and soils that have slopes of as much as 20 percent. Also included are areas of Rock outcrop and Carrizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

The soil in this unit is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this unit. The included Carrizo soils in drainageways are much more productive than the rest of the unit. Management of this unit should therefore be concentrated on these included soils.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the depth to the hardpan. The limited depth to the hardpan interferes with excavation, and ripping the pan may be neccesary.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the depth to the hardpan. The hardpan restricts the movement of effluent. Effluent may saturate the soil to the surface in nearly level areas, and it may seep to the surface downslope in steeper areas. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the restricted soil depth, the size of the absorption field may have to be increased. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable adjacent areas or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 7- to 10-inch p.z., range site.

22—Contine clay loam. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slope of less than 1 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is brown, calcareous clay loam about 2 inches thick. The subsoil is reddish brown, calcareous clay loam and clay 28 inches thick. The substratum to a depth of 60 inches or more is light reddish brown, calcareous sandy loam. In some areas this soil is affected by salts and sodium.

Included in this unit are small areas of Carefree, Ebon, and Mohall soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Contine soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. A few areas of this soil on the General Motors proving grounds are subject to rare periods of flooding.

This unit is used as irrigated cropland, as rangeland, as wildlife habitat, and for urban development.

If this unit is used as irrigated cropland, the main limitation is slow permeability. The design of the irrigation system should insure that water adequately permeates the soil. Sprinkler irrigation systems are not well suited to

the soil in this unit because of the slow water intake rate. Basin irrigation generally is an efficient system for insuring adequate infiltration. In the more sloping areas, it may not be feasible to move the amount of soil material needed to level fields. Use of a graded system is more feasible in such areas. Leveling cuts may expose concentrations of lime; therefore, an onsite investigation is advisable before irrigation systems are planned and leveling cuts are made.

It is necessary to leach salts out of the root zone every year to prevent buildup of salts in the soil, particularly where graded irrigation systems are used. Leaching is especially critical where water quality is poor. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth. A plowpan develops easily in this soil; therefore, the soil should not be tilled when wet. Varying the plowing depth helps to keep a plowpan from developing.

This unit has moderate potential for producing forage. It responds slowly to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The unit is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has low shrink-swell potential. In addition, more reinforcement can be provided.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. Poor design of septic tank absorption fields can seriously compound shrink-swell problems if foundations are close to the absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in the Clay Loam Upland, 7- to 10-inch p.z., range site.

23—Contine clay. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is reddish brown, calcareous clay 12 inches thick. The subsoil is light reddish brown, calcareous clay 14 inches thick. The substratum to a depth of 60 inches or more is light reddish brown, calcareous gravelly clay. In some areas the surface layer is sandy clay or gravelly clay loam. In uncultivated areas the soil has a clay loam surface layer. In most cultivated areas, however, the material in the original surface layer has been mixed with that in the subsoil and the texture of the surface layer is clay. In some areas this soil is affected by salts and sodium.

Included in this unit are small areas of Carefree, Ebon, and Mohall soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Contine soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as irrigated cropland, as rangeland, as wildlife habitat, and for urban development.

If the soil in this unit is used as irrigated cropland, the main limitation is the slow permeability. The design of the irrigation system should insure that water adequately permeates the soil. Areas that are adjacent to soils that have a higher water intake rate should be irrigated separately and at a lower application rate. Sprinkler irrigation systems are not well suited to this soil because of its slow water intake rate. Basin irrigation generally is an efficient system for insuring adequate infiltration. In the more sloping areas, moving the amount of soil material needed to level fields may not be feasible. Use of a graded system is more feasible in these areas. Leveling cuts may expose concentrations of lime at a depth of about 20 to 40 inches; therefore, an onsite investigation is advisable before irrigation systems are planned and leveling cuts are made.

It is necessary to leach salts out of the root zone every year to prevent buildup of salts in the soil, particularly where graded irrigation systems are used. Leaching is especially critical where water quality is poor. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth. A plowpan

develops easily in this soil; therefore, the soil should not be tilled when wet. Varying the plowing depth helps to keep a plowpan from developing.

This unit has moderate potential for producing forage. It responds well to rangeland management. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and therefore should be used during the growing season. Fencing and developing watering facilities help to control grazing.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has low shrink-swell potential. In addition, more reinforcement can be provided.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. Poor design of septic tank absorption fields can seriously compound shrink-swell problems when foundations are installed close to the absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in the Clayey Upland, 7- to 10-inch p.z., range site.

24—Continental clay loam, 0 to 3 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is light brown clay loam about 1 inch thick. The subsoil is brown, reddish brown, and light reddish brown clay about 59 inches thick. In some areas the surface layer is gravelly clay loam. In some areas this soil is affected by salts and sodium.

Included in this unit are small areas of Eba and Mohave soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, wildlife habitat, and irrigated cropland.

This unit has high potential for producing forage. It responds slowly to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If the soil in this unit is used as irrigated cropland, the main limitation is the slow permeability. The design of the irrigation system should insure that water adequately permeates the soil. Areas that are adjacent to soils that have a higher water intake rate should be irrigated separately and at a lower application rate. Sprinkler irrigation systems are not well suited to this soil because of its slow water intake rate. Basin irrigation generally is an efficient system for insuring adequate infiltration. In the more sloping areas, moving the amount of soil material needed to level fields may not be feasible. Use of a graded system is more feasible in such areas.

Leveling cuts may expose concentrations of lime at a depth of 20 to 40 inches; therefore, an onsite investigation is advisable before irrigation systems are planned and leveling cuts are made.

It is necessary to leach salts out of the root zone every year to prevent buildup of salts in the soil, particularly where graded irrigation systems are used. Leaching is especially critical where water quality is poor. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth. A plowpan develops easily in this soil; therefore, the soil should not be tilled when wet. Varying the plowing depth helps to keep a plowpan from developing.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in the Clay Loam Upland, 8- to 10-inch p.z., range site.

25—Continental clay, 0 to 3 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is light brown clay about 1 inch thick. The subsoil is brown, reddish brown, and light reddish brown clay about 59 inches thick. In some areas the surface layer is gravelly clay loam. In uncultivated areas the soil has a clay loam surface layer. In most cultivated areas, however, the material in the original

surface layer has been mixed with that in the subsoil and the texture of the surface layer is clay. In some areas this soil is affected by salts and sodium.

Included in this unit are small areas of Eba and Mohave soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as irrigated cropland. A few areas are used as rangeland and wildlife habitat.

If the soil in this unit is used as irrigated cropland, the main limitation is the slow permeability. The design of the irrigation system should insure that water adequately permeates the soil. Areas that are adjacent to soils that have a higher water intake rate should be irrigated separately and at a lower application rate. Sprinkler irrigation systems are not well suited to this soil because of its slow water intake rate. Basin irrigation generally is an efficient system for insuring adequate infiltration. In the more sloping areas, moving the amount of soil material needed to level fields may not be feasible. Use of a graded system is more feasible in such areas.

Leveling cuts may expose concentrations of lime at a depth of 20 to 40 inches; therefore, an onsite investigation is advisable before irrigation systems are planned and leveling cuts are made.

It is necessary to leach salts out of the root zone every year to prevent buildup of salts in the soil, particularly where graded irrigation systems are used. Leaching is especially critical where water quality is poor. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth. A plowpan develops easily in this soil; therefore, the soil should not be tilled when wet. Varying the plowing depth helps to keep a plowpan from developing.

This unit has moderate potential for producing forage. It responds well to rangeland management. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season. Fencing and developing watering facilities help to control grazing.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in the Clayey Upland, 8- to 10-inch p.z., range site.

26—Continental cobbly clay loam, 1 to 8 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is light brown, calcareous cobbly clay loam about 2 inches thick. The upper 16 inches of the subsoil is brown, calcareous clay, and the lower 42 inches is light brown and brown, calcareous clay. In some areas the surface layer is cobbly clay or gravelly loam. In some areas this soil is noncalcareous to a depth of 20 inches or more.

Included in this unit are small areas of Ohaco and Suncity Variant soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

This unit has high potential for producing forage. It responds well to rangeland management. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season. Fencing and developing watering facilities help to control grazing.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has low shrink-swell potential. In addition, more reinforcement can be provided.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. Poor design of septic tank absorption fields can seriously compound shrink-swell problems when foundations are installed close to the absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clayey Upland, 10- to 12-inch p.z., range site.

27—Continental-Mohave complex, 1 to 7 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 55 percent Continental clay loam and 20 percent Mohave sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Guest soils on bottoms. The included areas make up about 25 percent of the total acreage.

The Continental soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown clay loam about 1 inch thick. The subsoil is light reddish brown and reddish brown clay 59 inches thick or more.

Permeability of the Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Mohave soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 2 inches thick. The subsoil is yellowish red clay loam about 18 inches thick. The upper 15 inches of the substratum is light brown, calcareous very fine sandy loam, and the lower part to a depth of 60 inches or more is light brown, calcareous loam. In some areas the surface layer is gravelly sandy loam.

Permeability of the Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Continental soil has high potential for producing forage. It responds well to rangeland management. The Mohave soil has moderate potential for producing forage. It responds moderately well to rangeland management. This unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Proper placement of fences and watering facilities helps to control the distribution of grazing. A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit.

This map unit is in capability subclass VIIs, nonirrigated. The Continental soil is in the Clay Loam Upland, 8- to 10-inch p.z., range site, and the Mohave soil is in the Loamy Upland, 8- to 10-inch p.z., range site.

28—Continental-Ohaco complex. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 70 percent Continental cobbly clay loam and 20 percent Ohaco gravelly loam. The Continental soil is in concave areas, and the Ohaco soil is in convex areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Eba and Suncity Variant soils on fan terraces and Anthony and Arizo soils in drainageways. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Continental soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous cobbly clay loam about 2 inches thick. The upper 16 inches of the subsoil is brown, calcareous clay, and the lower 42 inches is light brown and brown, calcareous clay. In some areas the surface layer is cobbly clay or gravelly loam. In some areas this soil is noncalcareous to a depth of 20 inches or more.

Permeability of the Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Ohaco soil is moderately deep and well drained. It formed in alluvium derived dominantly form acid and basic igneous rock. Typically, the surface layer is brown gravelly loam about 2 inches thick. The upper 14 inches of the subsoil is yellowish red clay loam, and the lower 11 inches is yellowish red clay. The substratum to a depth of 31 inches or more is pink gravelly sandy loam. A silica- and lime-cemented hardpan is at a depth of about 31 inches. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of this Ohaco soil is slow. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The Continental soil has high potential for producing forage, and the Ohaco soil has moderate potential. They respond well to rangeland management. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season. Fencing and developing watering facilities are important practices that can be used to control grazing.

A few small areas of this unit in the northwestern part of the survey area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soils in this unit are used as sites for buildings or roads, the main limitatiions are the shrink-swell potential

and, in the Ohaco soil, the depth to the hardpan. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has low shrink-swell potential. In addition, more reinforcement can be provided. The limited depth to the hardpan interferes with excavation. Ripping the pan may be necessary.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the slow permeability and, in the Ohaco soil, the depth to the hardpan. The limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

In the Ohaco soil, the hardpan restricts the movement of effluent. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable soils in adjacent areas or installing community sewage systems. Poor design of septic tank absorption fields can seriously compound shrink-swell problems when foundations are installed close to the absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clayey Upland, 10- to 12-inch p.z., range site.

29—Denure-Momoli-Carrizo complex. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Denure fine sandy loam, 30 percent Momoli gravelly sandy loam, and 20 percent Carrizo gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Gilman, Maripo, and Carrizo soils on flood plains. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Denure soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown fine sandy loam about 2 inches thick. The underlying material to a depth of 60 inches or more is light brown sandy loam and gravelly sandy loam. This soil is calcareous below a depth of about 8 inches. In some areas the surface layer is gravelly sandy loam.

Permeability of the Denure soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Momoli soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown gravelly sandy loam about 10 inches thick. The next layer is light brown, calcareous very gravelly and extremely gravelly sandy loam about 22 inches thick. The substratum to a depth of 60 inches or more is brown extremely gravelly sandy loam. In some areas the surface layer is sandy loam or very gravelly sandy loam.

Permeability of the Momoli soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown gravelly sandy loam about 10 inches thick. The upper 13 inches of the underlying material is light brown very gravelly loamy sand, and the lower part to a depth of 60 inches or more is light brown, calcareous extremely gravelly sand.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit have moderate potential for producing forage. They respond well to rangeland management. Where the range is in good or excellent condition, the soils produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover. In a few areas these soils are calcareous in the surface layer and are therefore less productive than in most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Sandy Loam Upland, 7- to 10-inch p.z., range site.

30—Denure-Momoli-Carrizo complex, low precipitation. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation i s 1,400 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Denure fine sandy loam, 30 percent Momoli gravelly sandy loam, and 20 percent

Carrizo gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Gilman, Maripo, and Carrizo soils on flood plains. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Denure soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown fine sandy loam about 2 inches thick. The underlying material to a depth of 60 inches or more is light brown fine sandy loam and gravelly sandy loam. The soil is calcareous below a depth of about 8 inches. In some areas the surface layer is gravelly sandy loam.

Permeability of the Denure soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Momoli soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown gravelly sandy loam about 10 inches thick. The next layer is light brown, calcareous very gravelly and extremely gravelly sandy loam about 22 inches thick. The substratum to a depth of 60 inches or more is brown extremely gravelly sandy loam. In some areas the surface layer is sandy loam or very gravelly sandy loam.

Permeability of the Momoli soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown gravelly sandy loam about 10 inches thick. The upper 13 inches of the underlying material is light brown very gravelly loamy sand, and the lower part to a depth of 60 inches or more is light brown, calcareous extremely gravelly sand.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit have low potential for producing forage. They respond well to seasonal rangeland management. Where the range is in good or excellent condition, the soils produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

The soils in areas of this unit west of Tonopah commonly are calcareous throughout and are less productive than in most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Sandy Loam Upland, 2- to 7-inch p.z., range site.

31—Dixaleta-Rock outcrop complex, 25 to 65 percent slopes. This map unit is on mountain slopes and hill slopes. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 55 percent Dixaleta extremely channery sandy loam and 35 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Ohaco, Nickel, Cave, and Eba soils on fan terraces, Gran and Lehmans soils on mountain slopes, and exposed volcanic ash deposits. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Dixaleta soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from schist. Typically, the surface layer is yellowish brown extremely channery sandy loam about 1 inch thick. The subsoil is yellowish brown, calcareous extremely channery sandy loam about 7 inches thick. Below this to a depth of 27 inches is highly fractured and partially weathered schist. Unweathered schist is at a depth of 27 inches. In some areas this soil is noncalcareous throughout.

Permeability of the Dixaleta soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of granite, andesite, and vertically oriented schist.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The Dixaleta soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Areas of this soil generally are not so steep and are easier for livestock to traverse than are other mountainous parts of the survey area. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

If this unit is used as sites for buildings or roads, the main limitations are depth to rock, the areas of Rock outcrop, and slope. The cuts needed to provide nearly level building sites or roadbeds can expose soft bedrock that is relatively easy to excavate. Hard rock may be encountered in some areas. Because of the steepness of slope, extensive cutting and filling are necessary to

create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff. The steeper areas of the Dixaleta soil are subject to slippage when saturated. Water should be diverted away from buildings in these areas. The use of retaining walls or anchored footings also reduces the hazard of slippage.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the depth to rock and slope. Septic tank absorption fields may not function properly in some areas of this unit. The limited depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Steepness of slope makes it difficult to control the distribution of effluent. Effluent can move along the surface of the bedrock and seep to the surface in downslope areas, creating a hazard to health. If the soil becomes saturated with water, slippage can occur in downslope areas. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Schist Hills, 10- to 12-inch p.z., range site.

32—Dixaleta-Rock outcrop complex, low precipitation, 25 to 65 percent slopes. This map unit is on mountain slopes and hill slopes. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 55 percent Dixaleta extremely channery sandy loam and 35 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Ohaco, Nickel, Cave, and Eba soils on fan terraces, Gran and Lehmans soils on mountain slopes, and exposed volcanic ash deposits. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Dixaleta soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from schist. Typically, the surface layer is yellowish brown extremely channery sandy loam about 1 inch thick. The subsoil is yellowish brown, calcareous extremely channery sandy loam about 7 inches thick. Below this to a depth of 27 inches is highly fractured and partially weathered schist. Unweathered schist is at a depth of 27 inches. In some areas this soil is noncalcareous throughout.

Permeability of the Dixaleta soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of quartz, andesite, and vertically oriented schist.

This unit is used as rangeland and wildlife habitat.

The Dixaleta soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Areas of this soil generally are not so steep and are easier for livestock to traverse than are other mountainous parts of the survey area. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Schist Hills, 8- to 10-inch p.z., range site.

33—Eba very gravelly loam, 1 to 8 percent slopes. This deep and well drained soil is on fan terraces and stream terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 2,000 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Included in this unit are small areas of Pinaleno and Continental soils on fan terraces. Also included are small areas of soils that have a silica-cemented hardpan at a depth of 10 to 40 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the

vegetation. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit in the northwestern part of the survey area receive less precipitation than is typical for the unit. These areas are somewhat less productive than are most other areas of the unit.

If the soil in this unit is used as sites for buildings or roads, it has few limitations. If the soil is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clay Loam Upland, 10- to 12-inch p.z., range site.

34—Eba very gravelly loam, 8 to 20 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 2,000 to 3,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Included in this unit are small areas of Pinaleno and Continental soils on fan terraces. Also included are small areas of soils that have a silica-cemented hardpan at a depth of 10 to 40 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

This unit has moderate potential for producing forage. It responds moderately well to rangeland mangement. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the slope. In the steeper areas, extensive cutting and filling may be required to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetaing to slow runoff.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the slow permeability and slope. The limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. It is difficult to control the distribution of effluent in the steeper areas of the unit. Absorption lines should be placed on the contour in these areas to slow the flow of effluent to achieve a more nearly even distribution.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clay Loam Upland, 10- to 12-inch p.z., range site.

35—Eba very gravelly loam, low precipitation, 8 to 20 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 2,000 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Included in this unit are small areas of Pinaleno and Continental soils on fan terraces. Also included are small areas of soils that have a silica-cemented hardpan at a depth of 10 to 40 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. It responds slowly to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clay Loam Upland, 8- to 10-inch p.z., range site.

36—Eba-Continental complex, 1 to 8 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 2,500 feet. The average annual precipitation is

8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Eba very gravelly loam and 35 percent Continental clay loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Ohaco, Pinaleno, Suncity Variant, and Tres Hermanos soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Continental soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown clay loam about 1 inch thick. The subsoil is brown, reddish brown, and light reddish brown clay 59 inches thick or more.

Permeability of the Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Eba soil has moderate potential for producing forage, and the Continental soil has high potential. They respond slowly to rangeland management. The soils can produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit in the eastern part of the survey area receive more precipitation than is typical for the unit. These areas are somewhat more productive than most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clay Loam Upland, 8- to 10-inch p.z., range site.

37—Eba-Continental-Cave association, 3 to 20 percent slopes. This map unit is on fan terraces. The Eba and Continental soils have slopes of 3 to 8 percent, and the Cave soil has slopes of 3 to 20 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 40 percent Eba very gravelly loam, 25 percent Continental clay loam, and 20 percent Cave gravelly loam. The Eba and Continental soils are dominantly on the tops of terraces, and the Cave soil is on side slopes.

Included in this unit are small areas of Anthony and Arizo soils on flood plains and Greyeagle, Ohaco, Nickel, and Pinaleno soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Continental soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown clay loam about 1 inch thick. The subsoil is brown, reddish brown, and light reddish brown clay 59 inches thick or more.

Permeability of the Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Cave soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous gravelly loam about 1 inch thick. The next layer is pinkish gray, calcareous loam about 13 inches thick over a pinkish white, lime-cemented hardpan about 6 inches thick. Below this to a depth of 60 inches or more is pinkish white, calcareous very gravelly sandy loam.

Permeability of the Cave soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

The Eba soil has moderate potential for producing forage, and the Continental soil has high potential. They respond slowly to rangeland management. The soils can produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

The Cave soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to

rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil.

If the Eba soil is used as sites for buildings or roads, it has few limitations. It is better suited to use as sites for buildings and roads than are the Continental and Cave soils; therefore, buildings and roads should be located in areas of the Eba soil if feasible.

If the Eba soil is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

If the Continental soil is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has low shrink-swell potential. In addition, more reinforcement can be provided.

If the Continental soil is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

If the Cave soil is used as sites for buildings or roads, the main limitations are the depth to the hardpan and slope. The cuts needed to provide nearly level building sites or roadbeds can expose a hardpan that may be difficult to excavate. Ripping the pan may be necessary.

If the Cave soil is used for septic tank absorption fields, the main limitations are the depth to the hardpan and slope. The hardpan restricts the movement of effluent. Effluent can move along the surface of the hardpan and seep to the surface in downslope areas, creating a hazard to health. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the restricted soil depth, the size of absorption fields may have to be increased. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable adjacent soils or installing community sewage systems. It is difficult to control the distribution of effluent in the steeper areas of this soil. Absorption lines should be placed on the contour in these areas to slow the flow of effluent and to achieve a more nearly even distribution.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Eba and Continental soils are in the Clay Loam Upland, 10- to 12-inch p.z., range site, and the Cave soil is in the Limy Upland, 10- to 12-inch p.z., range site.

38—Eba-Continental-Cave association, low precipitation, 3 to 20 percent slopes. This map unit is on fan terraces. The Eba and Continental soils have slopes of 3 to 8 percent, and the Cave soil has slopes of 3 to 20 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 40 percent Eba very gravelly loam, 25 percent Continental clay loam, and 20 percent Cave gravelly loam. The Eba and Continental soils are dominantly on the tops of terraces, and the Cave soil is on the side slopes.

Included in this unit are small areas of Anthony and Arizo soils on flood plains and Greyeagle, Ohaco, Nickel, and Pinaleno soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Continental soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown clay loam about 1 inch thick. The subsoil is brown, reddish brown, and light reddish brown clay 59 inches thick or more.

Permeability of the Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Cave soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous gravelly loam about 1 inch thick. The next layer is pinkish gray, calcareous loam about 13 inches thick over a pinkish white, lime-cemented hardpan about 6 inches thick. Below this to a depth of 60 inches or more is pinkish white, calcareous very gravelly sandy loam.

Permeability of the Cave soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

The Eba soil has moderate potential for producing forage, and the Continental soil has high potential. They respond slowly to rangeland management. These soils can produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to to control grazing.

The Cave soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil.

If the Eba soil is used as sites for buildings or roads, it has few limitations. The Eba soil is better suited to use as sites for buildings and roads than are the Continental and Cave soils; therefore, buildings and roads should be located in areas of the Eba soil if feasible.

If the Eba soil is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

If the Continental soil is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential. In addition, more reinforcement can be provided.

If the Continental soil is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

If the Cave soil is used as sites for buildings or roads, the main limitations are the depth to the hardpan and slope. The cuts needed to provide nearly level building sites or roadbeds can expose a hardpan that may be difficult to excavate. Ripping the pan may be necessary.

If the Cave soil is used for septic tank absorption fields, the main limitations are the depth to the hardpan and slope. The hardpan restricts the movement of effluent. Effluent can move along the surface of the hardpan and seep to the surface in downslope areas, creating a hazard to health. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the shallow soil depth, the size of absorption fields may have to be increased. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable adjacent soils or installing community sewage systems. It is difficult to control the distribution of effluent in the steeper areas of this soil. Absorption lines should be placed on the contour in these areas to slow the flow of effluent and to achieve a more nearly even distribution.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields on this unit.

This map unit is in capability subclass VIIs, nonirrigated. The Eba and Continental soils are in the Clay Loam Upland, 8- to 10-inch p.z., range site, and the Cave soil is in the Limy Upland, 8- to 10-inch p.z., range site.

39—Eba-Nickel-Cave association, 3 to 25 percent slopes. This map unit is on fan terraces. The Eba soil has slopes of 3 to 8 percent, and the Nickel and Cave soils have slopes of 3 to 25 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 30 percent Eba very gravelly loam, 25 percent Nickel gravelly sandy loam, and 25 percent Cave gravelly loam. The Eba soils are dominantly on the tops of terraces, and the Cave and Nickel soils are on the side slopes.

Included in this unit are small areas of Arizo soils on flood plains and Pinaleno, Suncity Variant, Greyeagle, and Ohaco soils on fan terraces. Also included are areas of Rock outcrop in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Nickel soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray, calcareous gravelly sandy loam about 1 inch thick. The

upper 9 inches of the underlying material is pinkish gray, calcareous gravelly loam, the next 40 inches is pinkish gray, calcareous very gravelly sandy loam, and the lower part to a depth of 60 inches or more is white, calcareous very gravelly loamy sand.

Permeability of the Nickel soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Cave soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous gravelly loam about 1 inch thick. The next layer is pinkish gray, calcareous loam about 13 inches thick over a pinkish white, lime-cemented hardpan about 6 inches thick. Below this to a depth of 60 inches or more is pinkish white, calcareous very gravelly sandy loam.

Permeability of the Cave soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Eba soil has moderate potential for producing forage. It responds slowly to rangeland management. This soil can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

A few small areas of this soil in the northeastern part of the survey area receive more precipitation than is typical for the soil. These areas are somewhat more productive than most other areas of the soil.

The Nickel soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Fencing and developing watering facilities help to control grazing.

The Cave soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil.

This map unit is in capability subclass VIIs, nonirrigated. The Eba soil is in the Clay Loam Upland, 8- to 10-inch p.z., range site; the Nickel soil is in the Limy Slopes, 8- to 10-inch p.z., range site; and the Cave soil is in the Limy Upland, 8- to 10-inch p.z., range site.

40—Eba-Pinaleno complex, 3 to 20 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Eba very gravelly loam and 35 percent Pinaleno very gravelly clay loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo and Anthony soils in drainageways and Continental, Ohaco, Greyeagle, Nickel, Vado, and Tres Hermanos soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly clay and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Pinaleno soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish red very gravelly clay loam about 1 inch thick. The upper 11 inches of the subsoil is yellowish red, calcareous gravelly clay loam and very gravelly clay loam, and the lower 12 inches is light brown, calcareous gravelly loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam.

Permeability of the Pinaleno soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

This unit has moderate potential for producing forage. The Eba soil responds slowly to rangeland management, and the Pinaleno soil responds well. This unit produces forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Proper placement of fences and watering facilities helps to control the distribution of grazing.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the slope. In the steeper areas, extensive cutting and filling may be required to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the slow permeability of the Eba soil and the slope. The Pinaleno soil is better suited to use for septic tank absorption fields than is the Eba soil; therefore, absorption fields

should be located in areas of the Pinaleno soil if feasible. If absorption fields are located in areas of the Eba soil, the limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

It is difficult to control the distribution of effluent in the steeper areas of the unit. Absorption lines should be placed on the contour in these areas to slow the flow of effluent and to achieve a more nearly even distribution.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Eba soil is in the Clay Loam Upland, 10- to 12-inch p.z., range site, and the Pinaleno soil is in the Loamy Upland, 10- to 12-inch p.z., range site.

41—Eba-Pinaleno complex, 20 to 40 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Eba very gravelly loam and 35 percent Pinaleno very gravelly clay loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Ohaco and Tres Hermanos soils scattered throughout the unit and Anthony and Arizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate.

The Pinaleno soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish red very gravelly clay loam about 1 inch thick. The upper 11 inches of the subsoil is yellowish red, calcareous gravelly clay loam and very gravelly clay loam, and the lower 12 inches is light brown, calcareous gravelly loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam. In some areas a buried soil is below the substratum.

Permeability of the Pinaleno soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

This unit has high potential for producing forage. It responds slowly to rangeland management. It can produce forage year round. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the slope and shrink-swell potential. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff. The effects of shrinking and swelling on building foundations, concrete structures, and paved areas can be minimized by using an appropriate engineering design.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the slow permeability of the Eba soil and slope. The Pinaleno soil is better suited to use for septic tank absorption fields than is the Eba soil; therefore, absorption fields should be located in areas of the Pinaleno soil if feasible. If absorption fields are located in areas of the Eba soil, the limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

It is difficult to control the distribution of effluent because of the steepness of slope. Effluent can seep to the surface downslope, creating a hazard to health. Absorption lines should be placed on the contour to slow the flow of effluent and produce more uniform distribution. To achieve the deepest possible infiltration and minimize downslope seepage, absorption lines should be placed at a greater depth.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Loamy Hills, 10- to 12-inch p.z., range site.

42—Eba-Pinaleno complex, low precipitation, 3 to 20 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Eba very gravelly loam and 35 percent Pinaleno very gravelly clay loam. The components of this unit are so intricately intermingled

that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo and Anthony soils in drainageways and Continental, Ohaco, Greyeagle, Nickel, Vado, and Tres Hermanos soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Pinaleno soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish red very gravelly clay loam about 1 inch thick. The upper 11 inches of the subsoil is yellowish red, calcareous gravelly clay loam and very gravelly clay loam, and the lower 12 inches is light brown, calcareous gravelly loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam. In some areas a buried soil is below the substratum.

Permeability of the Pinaleno soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. The Eba soil responds slowly to rangeland management, and the Pinaleno soil responds well. This unit produces forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Proper placement of fences and watering facilities helps to control the distribution of grazing.

This map unit is in capability subclass VIIs, nonirrigated. The Eba soil is in the Clay Loam Upland, 8- to 10-inch p.z., range site, and the Pinaleno soil is in the Loamy Upland, 8- to 10-inch p.z., range site.

43—Eba-Pinaleno complex, low precipitation, 20 to 40 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Eba very gravelly loam and 35 percent Pinaleno very gravelly clay loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Ohaco and Tres Hermanos soils scattered throughout the unit and Anthony and Arizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Eba soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pink very gravelly loam about 3 inches thick. The subsoil is reddish yellow very gravelly and extremely gravelly clay about 33 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly sandy loam. The soil is calcareous below a depth of about 11 inches.

Permeability of the Eba soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate.

The Pinaleno soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish red very gravelly clay loam about 1 inch thick. The upper 11 inches of the subsoil is yellowish red, calcareous gravelly clay loam and very gravelly clay loam, and the lower 12 inches is light brown, calcareous gravelly loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam. In some areas a buried soil is below the substratum.

Permeability of the Pinaleno soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. It responds slowly to rangeland management. It can produce forage year round. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Loamy Hills, 8- to 10-inch p.z., range site.

44—Ebon very gravelly loam, 1 to 8 percent slopes. This deep and well drained soil is on fan terraces and stream terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is light brown very gravelly loam about 1 inch thick. The upper 10 inches of the subsoil is yellowish red very gravelly clay, and the lower 32 inches is yellowish red, calcareous very gravelly sandy clay. The substratum to a depth of 60 inches or more is white, calcareous gravelly loamy sand.

Included in this unit are small areas of Cipriano, Contine, Beardsley, Luke, Gunsight, Mohall, and Pinamt soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Ebon soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat (fig. 5). A few areas are used for urban development.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If the soil in this unit is used as sites for buildings or roads, it has few limitations. If the soil is used for septic tank absorption fields, the main limitation is the slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clay Loam Upland, 7- to 10-inch p.z., range site.

45—Ebon very gravelly loam, 8 to 20 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches,

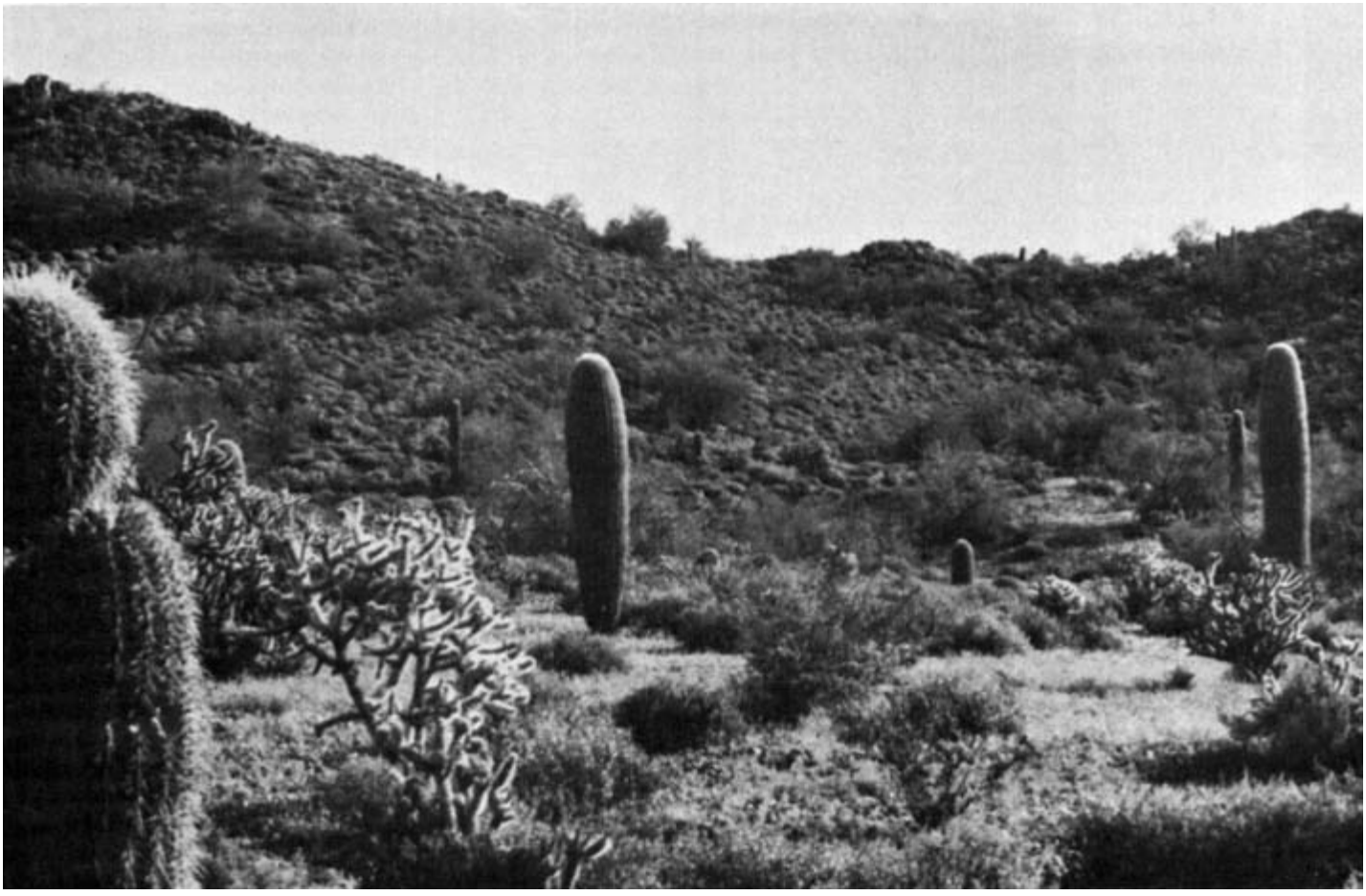

Figure 5.—Characteristic desert vegetation in an area of Ebon very gravelly loam, 1 to 8 percent slopes, in foreground. Valva very gravelly loam, 1 to 20 percent slopes, in background.

and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is light brown very gravelly loam about 1 inch thick. The upper 10 inches of the subsoil is yellowish red very gravelly clay, and the lower 32 inches is yellowish red, calcareous very gravelly sandy clay. The substratum to a depth of 60 inches or more is white, calcareous gravelly loamy sand.

Included in this unit are small areas of Contine, Luke, Beardsley, Pinamt, Mohall, Cipriano, and Gunsight soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Ebon soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the slope. In the steeper areas, extensive cutting and filling may be required to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the slow permeability and the slope. The limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. It is difficult to control the distribution of effluent in the steeper areas of the unit. Absorption lines should be placed on the contour in these areas to slow the flow of effluent to achieve a more nearly even distribution.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clay Loam Upland, 7- to 10-inch p.z., range site.

46—Ebon-Contine complex, 1 to 8 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Ebon very gravelly loam and 35 percent Contine clay loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Beardsley, Luke, Pinamt, Suncity, and Tremant soils on fan terraces and Carrizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Ebon soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown very gravelly loam about 1 inch thick. The upper 10 inches of the subsoil is yellowish red very gravelly clay, and the lower 32 inches is yellowish red, calcareous very gravelly sandy clay. The substratum to a depth of 60 inches or more is white, calcareous gravelly loamy sand.

Permeability of the Ebon soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Contine soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown clay loam about 2 inches thick. The subsoil is reddish brown, calcareous clay loam and clay 28 inches thick. The substratum to a depth of 60 inches or more is light reddish brown, calcareous sandy loam.

Permeability of the Contine soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clay Loam Upland, 7- to 10-inch p.z., range site.

47—Ebon-Gunsight-Cipriano association, 3 to 25 percent slopes. This map unit is on fan terraces. The Ebon soil has slopes of 3 to 8 percent, and the Gunsight and Cipriano soils have slopes of 3 to 25 percent. Elevation is 1,600 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 35 percent Ebon very gravelly clay loam, 20 percent Gunsight very gravelly sandy loam, and 20 percent Cipriano very gravelly loam. The Ebon soil is dominantly on the tops of terraces, the Gunsight soil is on the side slopes, and the Cipriano soil is on the side slopes and tops.

Included in this unit are small areas of Carrizo soils in drainageways and Beardsley, Contine, and Luke soils on

fan terraces. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Ebon soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown very gravelly clay loam about 3 inches thick. The upper 10 inches of the subsoil is yellowish red very gravelly clay, and the lower 32 inches is yellowish red, calcareous very gravelly sandy clay. The substratum to a depth of 60 inches or more is white, calcareous very gravelly loamy sand.

Permeability of the Ebon soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, calcareous very gravelly loam and pinkish gray very gravelly sandy loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light reddish brown, calcareous very gravelly loam about 1 inch thick. The underlying material is yellowish brown, calcareous very gravelly loam about 7 inches thick over a silica- and lime-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Ebon soil has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

The Gunsight and Cipriano soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the restricted available water capacity contribute to the low productivity of these soils.

This map unit is in capability subclass VIIs, nonirrigated. The Ebon soil is in the Clay Loam Upland, 7- to 10-inch p.z., range site, and the Gunsight and Cipriano soils are in the Limy Upland, 7- to 10-inch p.z., range site.

48—Ebon-Pinamt complex, 3 to 20 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Ebon very gravelly loam and 35 percent Pinamt extremely gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo and Antho soils in drainageways and Contine, Luke, Cipriano, Gunsight, Momoli, and Tremant soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Ebon soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown very gravelly loam about 1 inch thick. The upper 10 inches of the subsoil is yellowish red very gravelly clay, and the lower 32 inches is yellowish red, calcareous very gravelly sandy clay. The substratum to a depth of 60 inches or more is white, calcareous gravelly loamy sand.

Permeability of the Ebon soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Pinamt soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 1 inch of the surface layer is brown extremely gravelly sandy loam and the lower 2 inches is light brown very gravelly loam. The upper 12 inches of the subsoil is yellowish red very gravelly sandy clay loam, and the lower 13 inches is light brown, calcareous extremely gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous extremely gravelly sandy loam.

Permeability of the Pinamt soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. The unit produces forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Proper placement of fences and watering facilities helps to control the distribution of grazing.

A few small areas of this unit in the Hassayampa Plain area receive less precipitation than is typical for the unit.

These areas are somewhat less productive than most other areas of the unit.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the slope. In the steeper areas, extensive cutting and filling may be required to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the slow permeability of the Ebon soil and slope. The Pinamt soil is better suited to use for septic tank absorption fields than is the Ebon soil; therefore, absorption fields should be located in areas of the Pinamt soil if feasible. If absorption fields are located in areas of the Ebon soil, the limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

It is difficult to control the distribution of effluent in the steeper areas of the unit. Absorption lines should be placed on the contour in these areas to slow the flow of effluent and to achieve a more nearly even distribution.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Ebon soil is in the Clay Loam Upland, 7- to 10-inch p.z., range site, and the Pinamt soil is in the Loamy Upland, 7- to 10-inch p.z., range site.

49—Ebon-Pinamt complex, 20 to 40 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Ebon very gravelly loam and 35 percent Pinamt extremely gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Luke and Tremant soils scattered throughout the unit and Antho and Carrizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Ebon soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown very gravelly loam about 1 inch thick. The upper 10 inches of the subsoil is yellowish red very gravelly clay, and the lower 32 inches is yellowish red, calcareous very gravelly sandy clay. The substratum to a depth of 60 inches or more is white, calcareous gravelly loamy sand.

Permeability of the Ebon soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate.

The Pinamt soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 1 inch of the surface layer is brown extremely gravelly sandy loam and the lower 2 inches is light brown very gravelly loam. The upper 12 inches of the subsoil is yellowish red very gravelly sandy clay loam, and the lower 13 inches is light brown, calcareous extremely gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous extremely gravelly sandy loam.

Permeability of the Pinamt soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, as wildlife habitat, and for urban development.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit adjacent to the Hassayampa River receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the slope. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the slow permeability of the Ebon soil and slope. The Pinamt soil is better suited to use for septic tank absorption fields than is the Ebon soil; therefore, absorption fields should be located in areas of the Pinamt soil if feasible. If absorption fields are located in areas of the Ebon soil, the limitation of slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

It is difficult to control the distribution of effluent because of the steepness of slope. Effluent can seep to the surface downslope, creating a hazard to health. Absorption lines should be placed on the contour to slow the flow of effluent and produce more uniform distribution. To achieve the deepest possible infiltration and minimize downslope seepage, absorption lines should be placed at a greater depth.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Loamy Hills, 7- to 10-inch p.z., range site.

50—Estrella loams. These deep and well drained soils are on alluvial fans. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 45 percent of the soil in this unit is Estrella loam that is calcareous throughout, and 35 percent is Estrella loam that is noncalcareous in the surface layer and calcareous below. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Estrella soils is brown loam about 1 inch thick. The next layer is brown loam about 20 inches thick over a buried subsoil of yellowish red clay loam about 34 inches thick. Below this to a depth of 60 inches or more is pinkish white gravelly sandy loam. Depth to the buried subsoil ranges from 20 to 40 inches.

Included in this unit are small areas of Gilman and Valencia soils on flood plains and Mohall soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Estrella soils is moderate to the buried subsoil and moderately slow through it. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, these soils are subject to rare periods of flooding.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development and as irrigated cropland.

In areas where the soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Very little forage is available during the rest of the year.

In areas where the soils are noncalcareous in the surface layer, they have high potential for producing forage and respond well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit west of Tonopah receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit. A few areas are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for this unit.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the hazard of flooding. The soils are subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on these soils should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the hazard of flooding and the moderately slow permeability. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health. Where this unit is protected from flooding, the main limitation for septic tank absorption fields is the moderately slow permeability of the buried subsoil. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts to a depth of 20 to 40 inches generally expose the buried subsoil. In some areas this subsoil contains concentrations of lime; therefore, an onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. The Estrella loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site, and the Estrella loam that is noncalcareous in the surface layer is in the Loamy Upland, 7- to 10-inch p.z., range site.

51—Gachado-Lomitas complex, 8 to 25 percent slopes. This map unit is on hill slopes. Elevation is 1,200 to 2,600 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 50 percent Gachado very gravelly sandy loam and 25 percent Lomitas extremely gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Cherioni soils on steep hill slopes, Carrizo soils and exposed volcanic breccia in drainageways, and Ebon, Contine, and Tremant soils on the less sloping hill slopes and foot slopes. Also included are small areas of Denure and Gunsight soils on benches adjacent to drainageways. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Gachado soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from volcanic breccia and tuff. Typically, the surface layer is brown very gravelly sandy loam about 2 inches thick. The subsoil is yellowish red very gravelly sandy clay loam about 6 inches thick. Below this to a depth of 15 inches is weathered bedrock. Unweathered bedrock is at a depth of 15 inches.

Permeability of the Gachado soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

The Lomitas soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from volcanic breccia and tuff. Typically, the surface layer is pale brown, calcareous extremely gravelly sandy loam about 2 inches thick. The upper 4 inches of the subsoil is very pale brown, calcareous very gravelly sandy loam, and the lower part to a depth of 17 inches is light brown, calcareous extremely gravelly sandy loam. Weathered bedrock is at a depth of 17 inches. Unweathered bedrock is at a depth of 20 inches.

Permeability of the Lomitas soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Gachado soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

The Lomitas soil has low potential for producing forage. Creosotebush is the dominant vegetation on this soil. The soil responds very slowly to rangeland management.

This map unit is in capability subclass VIIs, nonirrigated. The Gachado soil is in the Volcanic Hills, 7- to 10-inch p.z., range site, and the Lomitas soil is in the Limy Hills, 7- to 10-inch p.z., range site.

52—Gachado-Lomitas-Rock outcrop complex, 7 to 55 percent slopes. This map unit is on mountain slopes and hill slopes. Elevation is 1,200 to 3,000 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Gachado very gravelly loam, 20 percent Lomitas very gravelly sandy loam, and 20 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo, Cherioni, Cipriano, Ebon, Gunsight, and Pinamt soils on fan terraces and Schenco and Vaiva soils on mountain slopes and hill slopes. Also included are small areas of exposed volcanic ash deposits. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Gachado soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from andesite, rhyolite, and tuff. Typically, the surface layer is light brown very gravelly loam about 1 inch thick. The subsoil is brown very gravelly clay loam about 6 inches thick. Bedrock is at a depth of 7 inches.

Permeability of the Gachado soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

The Lomitas soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from andesite, rhyolite, and tuff. Typically, the surface layer is brown very gravelly sandy loam about 1 inch thick. The subsoil is strong brown very gravelly sandy loam about 9 inches thick. Bedrock is at a depth of 10 inches.

Permeability of this Lomitas soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of andesite, rhyolite, and tuff.

This unit is used as rangeland, as wildlife habitat, and for urban development.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the depth to rock and slope. The cuts needed to provide nearly level building sites or roadbeds can expose bedrock that is difficult to excavate. Ripping or blasting, or both, may be necessary. The limited depth to bedrock also interferes with excavation for installing utilities. Because of the

steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the depth to rock and slope. Septic tank absorption fields may not operate properly in some areas of this unit. The limited depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Steepness of slope makes it difficult to control the distribution of effluent. Effluent can move along the surface of the bedrock and seep to the surface in downslope areas, creating a hazard to health. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Volcanic Hills, 7- to 10-inch p.z., range site.

53—Gadsden clay. This deep and well drained soil is on flood plains. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 1,800 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is light reddish brown clay about 3 inches thick. The upper 31 inches of the underlying material is light reddish brown, calcareous clay, and the lower part to a depth of 60 inches or more is reddish brown, calcareous clay.

Included in this unit are small areas of Contine soils on fan terraces and Glenbar soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Gadsden soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. This soil receives additional moisture from adjacent areas. It is subject to ponding following prolonged, high intensity storms. Where unprotected, this soil is subject to rare periods of flooding.

This unit is used as rangeland and wildlife habitat.

The soil in this unit is one of the most productive rangeland soils in the survey area. It receives extra water from runoff, which increases production. The soil responds well to rangeland management. It can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this unit are overgrazed. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season.

Grazing should be delayed until the soil is sufficiently drained and is firm enough to withstand trampling by livestock. If the plant cover is disturbed, the soil should be protected from flooding to control gullying, streambank cutting, and sheet erosion.

Parts of previously flooded areas have dried up as a result of livestock watering ponds built on this unit. This type of water development should be constructed at the distal end of bottom land areas.

In areas that have been invaded by woody species, the productivity of the soil can be improved by prescribed burning or by chemical or mechanical treatment of the brush. Other types of land uses should be considered in selecting a method of brush control.

A few small areas of this unit in the Hassayampa Plain area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clayey Bottom, 7- to 10-inch p.z., range site.

54—Gila fine sandy loams. These deep and well drained soils are on alluvial fans and flood plains. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

About 40 percent of the soil in this unit is Gila fine sandy loam that is noncalcareous in the surface layer and is calcareous below, and 40 percent is Gila fine sandy loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Gila soils is light yellowish brown fine sandy loam and very fine sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown very fine sandy loam and fine sandy loam. The soils commonly are stratified with thin layers of coarser or finer textured soil material. In some areas the soils are affected by salts and sodium.

Included in this unit are small areas of Anthony and Arizo soils in drainageways. Also included are small areas of soils that are similar to these Gila soils but are underlain by very gravelly sand, a reddish brown clay loam buried subsoil, or calcareous loam at a depth of 20

to 40 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, the soils are subject to rare periods of flooding.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used as irrigated cropland or for urban development.

In areas where the soils in this unit are noncalcareous in the surface layer, they have high potential for producing forage and respond well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

In areas where the soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

If this unit is used as irrigated cropland, it has few limitations. Because of the limited available water capacity of the surface layer, light and frequent irrigation is needed when plants are young. Generally, leveling cuts can be made to a depth of about 40 inches without exposing unfavorable soil material. An onsite investigation is advisable, however, before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops increases the available water capacity and improves tilth.

If this unit is used as sites for buildings or roads, the main limitation is the hazard of flooding. The unit is subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on this unit should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

If this unit is used for septic tank absorption fields, the main limitation is the hazard of flooding. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability class I, irrigated, and in capability subclass VIIs, nonirrigated. The Gila fine sandy loam that is noncalcareous in the surface layer is in the Sandy Loam Upland, 8- to 10-inch p.z., range site, and the Gila fine sandy loam that is calcareous throughout is in the Limy Fan, 8- to 10-inch p.z., range site.

55—Gilman loams. These deep and well drained soils are on flood plains and alluvial fans. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 40 percent of this unit is Gilman loam that is noncalcareous in the upper 5 inches and is calcareous below, and 40 percent is Gilman loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the upper 5 inches of these Gilman soils is reddish yellow loam. The next 38 inches is reddish yellow loam and very fine sandy loam. Below this to a depth of 60 inches or more is reddish yellow fine sandy loam.

Included in this unit are small areas of Antho and Carrizo soils in drainageways; Estrella, Glenbar, Maripo, Valencia, and Vint soils scattered throughout the unit; and Denure, Momoli, and Carrizo soils on fan terraces. Also included are small areas of soils that are similar to these Gilman soils but are underlain by very gravelly sand at a depth of less than 40 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Gilman soils is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, the soils are subject to rare periods of flooding.

This unit is used as rangeland, wildlife habitat, irrigated cropland, and urban development.

In areas where the soils in this unit are noncalcareous in the upper 5 inches, they have moderate potential for producing forage and respond well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

In areas where the soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual

grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit. A few small areas west of the White Tank Mountains receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If this unit is used as irrigated cropland, it has few limitations. Generally, leveling cuts can be made to a depth of about 40 inches without exposing unfavorable soil material. An onsite investigation is advisable, however, before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum and varying the plowing depth help to maintain soil tilth.

If this unit is used as sites for buildings or roads, the main limitation is the hazard of flooding. The unit is subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on this unit should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

If this unit is used for septic tank absorption fields, the main limitation is the hazard of flooding. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. The Gilman loam that is noncalcareous in the upper 5 inches is in the Loamy Upland, 7- to 10-inch p.z., range site, and the Gilman loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site.

56—Gilman loams, low precipitation. These deep and well drained soils are on flood plains and alluvial fans. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

About 40 percent of this unit is Gilman loam that is noncalcareous in the upper 5 inches and is calcareous below, and 40 percent is Gilman loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the upper 5 inches of these Gilman soils is reddish yellow loam. The next 38 inches is reddish yellow loam and very fine sandy loam. Below this to a depth of 60 inches or more is reddish yellow fine sandy loam.

Included in this unit are small areas of Antho and Carrizo soils in drainageways; Estrella, Glenbar, and Vint soils scattered throughout the unit; and Denure, Momoli, and Carrizo soils on fan terraces. Also included are small areas of soils that are similar to these Gilman soils but are underlain by very gravelly sand at a depth of less than 40 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Gilman soils is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, these soils are subject to rare periods of flooding.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used as irrigated cropland.

In areas where the soils in this unit are noncalcareous in the upper 5 inches, they have moderate potential for producing forage and respond well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

In areas where the soils are calcareous throughout, they have low potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit.

If this unit is used as irrigated cropland, it has few limitations. Generally, leveling cuts can be made to a depth of about 40 inches without exposing unfavorable soil material. An onsite investigation is advisable, however, before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. The Gilman loam that is noncalcareous in the upper 5 inches is in the Loamy Upland, 2- to 7-inch p.z., range site, and the Gilman loam that is calcareous throughout is in the Limy Fan, 2- to 7-inch p.z., range site.

57—Gilman clay loam. This deep and well drained soil is on alluvial fans. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,100 to 1,700 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the upper 11 inches of this soil is brown, calcareous clay loam. Below this to a depth of 60 inches or more is light brown, calcareous very fine sandy loam. In some areas the upper layer is loam.

Included in this unit are small areas of Glenbar and Vint soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Gilman soil is moderately slow in the upper layer and moderate below. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, this soil is subject to rare periods of flooding.

This unit is used as irrigated cropland.

If this unit is used as irrigated cropland, it has few limitations. Generally, leveling cuts can be made to a depth of about 40 inches without exposing unfavorable soil material. An onsite investigation is advisable, however, before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated.

58—Gilman-Momoli-Denure complex. This map unit is on fan terraces and the associated alluvial fans. Slope is 0 to 3 percent. Elevation is 1,400 to 1,800 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Gilman loam, 25 percent Momoli gravelly sandy loam, and 20 percent Denure gravelly sandy loam. The Gilman soil is in broad, flat swales, and the Denure and Momoli soils are on long, narrow, slightly convex ridges. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils on fan terraces and Antho, Carrizo, Estrella, and Maripo soils on flood plains and in drainageways. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Gilman soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown loam about 2 inches thick. The underlying material to a depth of 60 inches or more is reddish yellow fine sandy loam, very fine sandy loam, and loam. This soil is calcareous below a depth of about 8 inches.

Permeability of the Gilman soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, this soil is subject to rare periods of flooding.

The Momoli soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 10 inches is light brown gravelly sandy loam. The next 12 inches is light brown, calcareous gravelly sandy loam. Below this to a depth of 60 inches or more is light brown, calcareous extremely gravelly sandy loam. In some areas this soil is noncalcareous to a depth of 18 inches or more.

Permeability of the Momoli soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Denure soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 9 inches is light brown gravelly sandy loam. Below this to a depth of 60 inches or more is light brown, calcareous gravelly sandy loam. In some areas the soil is fine sandy loam or sandy loam throughout. In some areas this soil is noncalcareous to a depth of 16 inches or more.

Permeability of the Denure soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, the soils in this unit produce forage year round. The unit is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

This map unit is in capability subclass VIIs, nonirrigated. The Gilman soil is in the Loamy Upland, 7- to 10-inch p.z., range site, and the Momoli and Denure soils are in the Sandy Loam Upland, 7- to 10-inch p.z., range site.

59—Gilman-Momoli-Denure complex, low precipitation. This map unit is on fan terraces and the associated alluvial fans. Slope is 0 to 3 percent. Elevation is 1,400 to 1,800 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Gilman loam, 25 percent Momoli gravelly sandy loam, and 20 percent Denure gravelly sandy loam. The Gilman soil is in broad, flat swales, and the Denure and Momoli soils are on long,

narrow, slightly convex ridges. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils on fan terraces and Antho, Carrizo, Estrella, and Maripo soils on flood plains and in drainageways. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Gilman soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous loam about 2 inches thick. The underlying material to a depth of 60 inches or more is reddish yellow, calcareous fine sandy loam, very fine sandy loam, and loam.

Permeability of the Gilman soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, this soil is subject to rare periods of flooding.

The Momoli soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 22 inches of this soil is light brown, calcareous gravelly sandy loam. Below this to a depth of 60 inches or more is light brown, calcareous extremely gravelly sandy loam.

Permeability of the Momoli soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Denure soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, this soil is light brown, calcareous gravelly sandy loam throughout. In some areas the soil is fine sandy loam or sandy loam throughout.

Permeability of the Denure soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

This unit has low potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Fan, 2- to 7-inch p.z., range site.

60—Glenbar loams. These deep and well drained soils are on flood plains and alluvial fans. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 40 percent of this unit is Glenbar loam that is noncalcareous in the surface layer and is calcareous below, and 40 percent is Glenbar loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Glenbar soils is light brown loam about 6 inches thick. The upper 42 inches of the underlying material is light brown silty clay loam and clay loam, and the lower part to a depth of 60 inches or more is light reddish brown gravelly sandy clay loam.

Included in this unit are small areas of Antho, Estrella, Gilman, and Vint soils on flood plains and Mohall soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Glenbar soils is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, these soils are subject to rare periods of flooding.

Most areas of this unit are used as rangeland, as wildlife habitat, or for urban development. A few areas are used as irrigated cropland.

In areas where the soils in this unit are noncalcareous in the surface layer, they have moderate potential for producing forage and respond well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities are important practices that can be use d to control grazing.

In areas where the soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few small areas of this unit in the Hassayampa Plain area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit. A few areas are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for this unit.

If this unit is used as sites for buildings or roads, the main limitations are the hazard of flooding, the shrink-swell potential, and low soil strength. The unit is subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on this unit should be placed on

elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings. Where this unit is protected from flooding, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If this unit is used for septic tank absorption fields, the main limitations are the hazard of flooding and the moderately slow permeability. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health. Where this unit is protected from flooding, the limitation of moderately slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

If this unit is used as irrigated cropland, it has few limitations. Generally, leveling cuts can be made to a depth of about 40 inches without exposing unfavorable soil material. An onsite investigation is advisable, however, before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. The Glenbar loam that is noncalcareous in the surface layer is in the Loamy Upland, 7- to 10-inch p.z., range site, and the Glenbar loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site.

61—Gran-Wickenburg complex, 1 to 10 percent slopes. This map unit is on pediments and hill slopes. Elevation is 1,800 to 4,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 40 percent Gran very gravelly sandy loam and 35 percent Wickenburg gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Eba and Pinaleno soils on toe slopes and Arizo soils and Rock outcrop in drainageways. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Gran soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles and cobbles. The surface layer is reddish yellow very gravelly sandy loam about 1 inch thick. The subsoil is light red extremely gravelly sandy clay about 11 inches thick. Below this to a depth of 36 inches is light red, partially weathered granite. Unweathered bedrock is at a depth of 36 inches. In a few areas this soil has less clay than is typical.

Permeability of the Gran soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

The Wickenburg soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles and cobbles. The surface layer is light reddish brown gravelly sandy loam about 1 inch thick. The subsoil is reddish brown very gravelly sandy loam about 11 inches thick. Below this to a depth of 60 inches or more is reddish brown and pinkish gray, calcareous, partially weathered granite.

Permeability of the Wickenburg soil is moderately rapid. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

The soils in this unit have moderate potential for producing forage. They produce a good variety of perennial species. They respond slowly to rangeland management, but they can produce forage year round. Areas of this unit commonly are the only relatively flat areas in and around the steeper mountains, so cattle tend to overgraze these areas before moving to the steeper slopes. Placing watering facilities properly and fencing areas of this unit with the steeper areas help to encourage livestock to graze the steeper slopes.

In a few areas the Wickenburg soil is calcareous in the surface layer and is therefore less productive than it is in most other areas.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the shrink-swell potential of the Gran soil and the depth to rock. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential. In addition, more reinforcement can be

provided. The cuts needed to provide nearly level building sites or roadbeds can expose soft bedrock that is relatively easy to excavate. Hard rock may be encountered in some areas.

If the soils in this unit are used for septic tank absorption fields, the main limitation is the depth to rock. Septic tank absorption fields may not operate properly in some areas of this unit. The shallow depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Effluent may saturate the soil to the surface in the nearly level areas, and it may seep to the surface downslope in the steeper areas. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Shallow Upland, 10- to 12-inch p.z., range site.

62—Gran-Wickenburg complex, low precipitation, 1 to 10 percent slopes. This map unit is on pediments and hill slopes. Elevation is 1,800 to 4,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 40 percent Gran very gravelly sandy loam and 35 percent Wickenburg gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Eba and Pinaleno soils on toe slopes and Arizo soils and Rock outcrop in drainageways. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Gran soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles and cobbles. The surface layer is reddish yellow very gravelly sandy loam about 1 inch thick. The subsoil is light red extremely gravelly sandy clay about 11 inches thick. Below this to a depth of 36 inches is light red, partially weathered granite. Bedrock is at a depth of 36 inches. In a few areas this soil has less clay than is typical.

Permeability of the Gran soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

The Wickenburg soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles and cobbles. The surface layer is light reddish brown gravelly sandy loam about 1 inch thick. The subsoil is reddish brown very gravelly sandy loam about 11 inches thick. Below this to a depth of 60 inches or more is reddish brown, calcareous, partially weathered granite.

Permeability of the Wickenburg soil is moderately rapid. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit have moderate potential for producing forage. They produce a good variety of perennial species. They respond slowly to rangeland management, but they can produce forage year round. Areas of this unit commonly are the only relatively flat areas in and around steeper mountains, so cattle tend to overgraze these areas before moving to the steeper slopes. Placing watering facilities properly and fencing areas of this unit with steeper areas help to encourage livestock to graze the steeper slopes.

In a few areas the Wickenburg soil is calcareous in the surface layer and is therefore less productive than it is in most other areas.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Shallow Upland, 8- to 10-inch p.z., range site.

63—Gran-Wickenburg-Rock outcrop complex, 10 to 65 percent slopes. This map unit is on pediments, hill slopes, and mountain slopes (fig. 6). Elevation is 1,800 to 4,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 30 percent Gran very gravelly sandy loam, 25 percent Wickenburg gravelly sandy loam, and 25 percent Rock outcrop. The Gran and Wickenburg soils are dominantly on hill slopes and mountain slopes, and the Rock outcrop is scattered throughout the unit. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Dixaleta and Lehmans soils on mountain slopes. Also included are small areas of Eba and Pinaleno soils on toe slopes and Arizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Gran soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles, cobbles, stones, and boulders. The surface layer is reddish yellow very gravelly sandy loam about 1 inch thick. The subsoil is light red extremely gravelly sandy clay about 11 inches thick. Below the subsoil to a depth of 36 inches is light red, partially weathered granite. Unweathered bedrock is at a depth of 36 inches. In a few areas this soil has less clay than is typical.

Figure 6.—Typical area of Gran-Wickenburg-Rock outcrop complex, 10 to 65 percent slopes. The soils are shallow over granite.

Permeability of the Gran soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

The Wickenburg soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles, cobbles, stones, and boulders. The surface layer is light reddish brown gravelly sandy loam about 1 inch thick. The subsoil is reddish brown very gravelly sandy loam about 11 inches thick. Below the subsoil to a depth of 60 inches or more is reddish brown and pinkish gray, calcareous, partially weathered granite.

Permeability of the Wickenburg soil is moderately rapid. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of granite and gneiss.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

The Gran and Wickenburg soils have high potential for producing forage. They respond moderately well to rangeland management and can produce forage year round. Steepness of slope, the areas of Rock outcrop, and rock fragments on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

In a few areas the Wickenburg soil is calcareous in the surface layer and is therefore less productive than it is in most other areas.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the depth to rock, slope, and in the Gran soil, the shrink-swell potential. The cuts needed to provide nearly level building sites or roadbeds can expose soft bedrock that is relatively easy to excavate. Hard rock may be encountered in some areas. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff. The steeper areas of the Gran soil are subject to slippage when saturated. Water should be diverted away from buildings in these areas. The use of retaining walls or anchored footings also reduces the hazard of slippage. The effects of shrinking and swelling on building foundations, concrete structures, and paved areas can be minimized by using an appropriate engineering design.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the depth to rock and slope. Septic tank absorption fields may not operate properly in some areas of this unit. The shallow depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Steepness of slope makes it difficult to control the distribution of effluent. Effluent can move along the surface of the bedrock and seep to the surface in downslope areas, creating a hazard to health. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems. The use of septic tank absorption fields can create serious hazards in areas of the Gran soil. If the soil becomes saturated with water, slippage can occur in downslope areas.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Granitic Hills, 10- to 12-inch p.z., range site.

64—Gran-Wickenburg-Rock outcrop complex, low precipitation, 10 to 65 percent slopes. This map unit is on pediments, hill slopes, and mountain slopes. Elevation is 1,800 to 4,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 30 percent Gran very gravelly sandy loam, and 25 percent Wickenburg gravelly sandy loam, and 25 percent Rock outcrop. The Gran and Wickenburg soils are dominantly on hill slopes and mountain slopes, and the Rock outcrop is scattered throughout the unit. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Cellar soils near Yavapai County and Dixaleta and Lehmans soils on mountain slopes. Also included are small areas of Eba and Pinaleno soils on toe slopes and Arizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Gran soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles, cobbles, stones, and boulders. The surface layer is reddish yellow very gravelly sandy loam about 1 inch thick. The subsoil is light red extremely gravelly sandy clay about 11 inches thick. Below the subsoil to a depth of 36 inches is light red, partially weathered granite. Unweathered bedrock is at a depth of 36 inches. In a few areas this soil has less clay than is typical.

Permeability of the Gran soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

The Wickenburg soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from granite, latite, and gneiss. Typically, the surface is covered with pebbles, cobbles, stones, and boulders. The surface layer is light reddish brown gravelly sandy loam about 1 inch thick. The subsoil is reddish brown very gravelly sandy loam about 11 inches thick. Below the subsoil to a depth of 60 inches or more is reddish brown and pinkish gray, calcareous, partially weathered granite.

Permeability of the Wickenburg soil is moderately rapid. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of granite and gneiss.

This unit is used as rangeland and wildlife habitat.

The Gran and Wickenburg soils have moderate potential for producing forage. They respond moderately well to rangeland management. They can produce forage year round. Steepness of slope, the areas of Rock outcrop, and rock fragments on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

In a few areas the Wickenburg soil is calcareous in the surface layer and is therefore less productive than it is in most other areas.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Granitic Hills, 8- to 10-inch p.z., range site.

65—Greyeagle-Continental-Nickel association, 1 to 40 percent slopes. This map unit is on fan terraces. The Greyeagle and Nickel soils have slopes of 1 to 40 percent, and the Continental soil has slopes of 1 to 3 percent. Elevation is 1,800 to 3,300 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Greyeagle very gravelly loam, 25 percent Continental loam, and 15 percent Nickel very gravelly loam. The Greyeagle soil is on the tops and upper side slopes of fan terraces; the Continental soil is on lower side slopes of fan terraces; and the Nickel soil is on side slopes of fan terraces.

Included in this unit are small areas of Ohaco and Suncity Variant soils on toe slopes, in swales, and on fan terraces, Cave and Mohave soils on the tops of terraces, and Arizo soils in drainageways. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Greyeagle soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 1 inch of the surface layer is pink, calcareous very gravelly loam and the lower 4 inches is light brown, calcareous gravelly loam. The underlying material to a depth of 10 inches is light brown, calcareous very gravelly sandy loam. A pinkish white, silica-cemented hardpan is at a depth of about 10 inches. Depth to the hardpan ranges from 4 to 20 inches.

Permeability of the Greyeagle soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight to moderate.

The Continental soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish brown loam about 2 inches thick. The upper 3 inches of the subsoil is reddish yellow, calcareous clay loam, and the lower 55 inches or more is yellowish red, reddish brown, and reddish yellow, calcareous clay. In some areas a hardpan is at a depth of 13 to 60 inches or more.

Permeability of the Continental soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Nickel soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light gray, calcareous very gravelly loam.

Permeability of the Nickel soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Greyeagle soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the very low available water capacity contribute to the low productivity of this soil.

The Continental soil has high potential for producing forage. It responds moderately well to rangeland management. This soil can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

The Nickel soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Fencing and developing watering facilities help to control grazing.

This map unit is in capability subclass VIIe, nonirrigated. The Greyeagle soil is in the Limy Upland, 8- to 10-inch p.z., range site; the Continental soil is in the Clay Loam Upland, 8- to 10-inch p.z., range site; and the Nickel soil is in the Limy Slopes, 8- to 10-inch p.z., range site.

66—Greyeagle-Suncity Variant complex, 1 to 7 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 55 percent Greyeagle very gravelly loam and 30 percent Suncity Variant very gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils and Rock outcrop in drainageways and Cave, Ohaco, and Nickel soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Greyeagle soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 1 inch of the surface layer is pink, calcareous very gravelly loam and the lower 4 inches is light brown, calcareous gravelly loam. The underlying material is light brown, calcareous very gravelly sandy loam about 5 inches thick over a silica-cemented hardpan.

Permeability of the Greyeagle soil is moderately rapid. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

The Suncity Variant soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically,

the surface layer is brown, calcareous very gravelly sandy loam about 2 inches thick. The subsoil is brown, calcareous gravelly clay loam about 7 inches thick. A silica- and lime-cemented hardpan is at a depth of 9 inches.

Permeability of the Suncity Variant soil is slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

The Greyeagle and Suncity Variant soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the very low available water capacity contribute to the low productivity of these soils. The included Arizo soils in drainageways are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

In a few areas the Suncity Variant soil is noncalcareous in the surface layer and is therefore more productive than most other areas of the soil. A few small areas in the northwestern part of the survey area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soils in this unit are used as sites for buildings or roads, the main limitation is depth to the hardpan. The limited depth to the hardpan interferes with excavation. Ripping the pan may be necessary.

If the soils in this unit are used for septic tank absorption fields, the main limitation is depth to the hardpan. The hardpan restricts the movement of effluent. Effluent can move along the surface of the hardpan and seep to the surface in downslope areas, creating a hazard to health. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the shallow soil depth, the size of absorption fields may have to be increased. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable adjacent areas or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 10- to 12-inch p.z., range site.

67—Guest clay. This deep and well drained soil is on flood plains. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 1 percent. Elevation is 2,200 to 2,400 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is brown clay about 2 inches thick. The next layer is brown, calcareous clay about 37 inches thick. Below this to a depth of 60 inches or more is light brown, calcareous clay loam. In some areas this soil is affected by salts and alkali, and in some areas it is noncalcareous to a depth of 35 inches or more. In uncultivated areas the soil has a clay loam surface layer. In most cultivated areas, however, the material in the original surface layer has been mixed with that in the layer below and the texture of the surface layer is clay.

Included in this unit are small areas of Anthony, Continental, and Mohave soils in slightly higher areas. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Guest soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. This soil receives additional moisture from adjacent areas. It is subject to ponding following prolonged, high intensity storms. Where unprotected, this soil is subject to rare periods of flooding. Some overgrazed areas have actively eroding gullies 1 foot to 4 feet deep.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used as irrigated cropland.

The soil in this unit is one of the most productive rangeland soils in the survey area. It receives extra water from runoff, which increases production. The soil responds well to rangeland management. It can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this unit are overgrazed. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season.

Grazing should be delayed until the soil is sufficiently drained and is firm enough to withstand trampling by livestock. If the plant cover is disturbed, the soil should be protected from flooding to control gullying, streambank cutting, and sheet erosion.

Parts of previously flooded areas have dried up as a result of livestock watering ponds built on this unit. This type of water development should be constructed at the distal end of bottom land areas.

In areas that have been invaded by woody species, the productivity of the soil in this unit can be improved by prescribed burning or by chemical or mechanical treatment of the brush. Other types of land uses should be considered in selecting a method of brush control.

If the soil in this unit is used as irrigated cropland, the main limitation is the slow permeability. The design of the irrigation system should insure that water adequately permeates the soil. The soil should be irrigated separately from adjacent soils that have a higher water intake rate, and it should be irrigated at a lower application rate. Sprinkler irrigation systems are not well suited to this soil because of its slow water intake rate. Basin irrigation generally is an efficient system for insuring adequate infiltration. In the more sloping areas, moving the amount of soil material needed to level fields may not be feasible. Use of a graded system is more feasible in such areas. An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made.

It is necessary to leach salts out of the root zone every year to prevent buildup of salts in the soil, particularly where graded irrigation systems are used. Leaching is especially critical where water quality is poor. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth. A plowpan develops easily in this soil; therefore, it should not be tilled when wet. Varying the plowing depth helps to keep a plowpan from developing.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in the Clayey Bottom, 8- to 10-inch p.z., range site.

68—Gunsight-Cipriano complex, 1 to 7 percent slopes. This map unit is on fan terraces. Slopes are mainly 1 to 2 percent, but in some areas they are as much as 30 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Gunsight very gravelly sandy loam and 40 percent Cipriano very gravelly loam. The Gunsight soil is on side slopes, and the Cipriano soil is on the tops of terraces. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Gilman soils on flood plains, Carrizo soils in drainageways, and Pinamt, Rillito, and Tremant soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly sandy loam about 1 inch thick. The underlying material to a depth of 60 inches or more is light brown, calcareous very gravelly sandy loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly loam about 1 inch thick. The underlying material is light brown, calcareous very gravelly loam about 5 inches thick over a light brown and pinkish gray, silica-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches. In a few areas this soil has slightly less gravel than is typical.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

The Gunsight and Cipriano soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils. The included soils on bottoms are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

If the Gunsight soil is used as sites for buildings, roads, or septic tank absorption fields, it has few limitations. It is better suited to these uses than is the Cipriano soil; therefore, buildings, roads, and septic tank absorption fields should be located in areas of the Gunsight soil if feasible.

If the Cipriano soil is used as sites for buildings or roads, the main limitation is the depth to the hardpan. The limited depth to the hardpan interferes with excavation. Ripping the pan may be necessary.

If the Cipriano soil is used for septic tank absorption fields, the main limitation is the depth to the hardpan. The hardpan restricts the movement of effluent. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the limited soil depth, the size of absorption fields may have to be increased. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable adjacent areas or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 7- to 10-inch p.z., range site.

69—Gunsight-Cipriano complex, low precipitation, 1 to 7 percent slopes. This map unit is on fan terraces. Slopes mainly are 1 to 2 percent, but in some areas they are as much as 30 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Gunsight very gravelly sandy loam and 40 percent Cipriano very gravelly loam. The Gunsight soil is on side slopes, and the Cipriano soil is on the tops of terraces. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Gilman soils on flood plains, Carrizo soils in drainageways, and Pinamt, Rillito, and Tremant soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly sandy loam about 1 inch thick. The underlying material to a depth of 60 inches or more is light brown, calcareous very gravelly sandy loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly loam about 1 inch thick. The underlying material is light brown, calcareous very gravelly loam about 5 inches thick over a light brown and pinkish gray, silica-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches. In a few areas this soil has slightly less gravel than is typical.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Gunsight and Cipriano soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils. The included soils on flood plains are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 2- to 7-inch p.z., range site.

70—Gunsight-Rillito complex, 1 to 25 percent slopes. This map unit is on fan terraces. Elevation is 1,100 to 2,100 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Gunsight very gravelly loam and 40 percent Rillito gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Chuckawalla, Ebon, Mohall, Pinamt, and Tremant soils on the tops of terraces; Cipriano soils scattered throughout the unit; and Antho, Carrizo, and Gilman soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly loam about 11 inches thick. The underlying material to a depth of 60 inches or more is light brown and pinkish white, calcareous extremely gravelly loam. In some areas the surface layer is gravelly loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight.

The Rillito soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper layer of this soil is pinkish gray and very pale brown, calcareous gravelly loam about 12 inches thick. The next 24 inches is very pale brown, calcareous gravelly sandy loam. Below this to a depth of 60 inches or more is very pale brown, calcareous very gravelly sandy loam. In some areas the surface layer is loam or very gravelly loam.

Permeability of the Rillito soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Gunsight and Rillito soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils.

The included soils on flood plains are much more productive than the other soils in this unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 7- to 10-inch p.z., range site.

71—Gunsight-Rillito complex, low precipitation, 1 to 40 percent slopes. This map unit is on fan terraces. Elevation is 1,100 to 2,100 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Gunsight very gravelly loam and 40 percent Rillito gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Chuckawalla, Ebon, Mohall, Pinamt, and Tremant soils on the tops of terraces; Cipriano soils scattered throughout the unit; and Antho, Carrizo, and Gilman soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer of this soil is light brown, calcareous very gravelly loam about 11 inches thick. The underlying material to a depth of 60 inches or more is light brown and pinkish white, calcareous extremely gravelly loam. In some areas the surface layer is gravelly loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight to moderate.

The Rillito soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper layer of this soil is pinkish gray and very pale brown, calcareous gravelly loam about 12 inches thick. The next 24 inches is very pale brown, calcareous gravelly sandy loam. Below this to a depth of 60 inches or more is very pale brown, calcareous very gravelly sandy loam. In some areas the surface layer is loam or very gravelly loam.

Permeability of the Rillito soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The Gunsight and Rillito soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils.

The included soils on flood plains are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 2- to 7-inch p.z., range site.

72—Lehmans-Rock outcrop complex, 8 to 65 percent slopes. This map unit is on hill slopes and mountain slopes. Elevation is 1,800 to 4,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Lehmans very gravelly clay loam and 30 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils in drainageways, Eba and Pinaleno soils on foot slopes, and Greyeagle and Nickel soils in gently sloping areas between hills and mountains. Also included are small areas of exposed volcanic ash deposits and soils that have more rock fragments or lime than is typical for this Lehmans soil. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Lehmans soil is shallow and very shallow and is well drained. It formed in alluvium and colluvium derived dominantly from basalt, andesite, rhyolite, tuff, and agglomerate. Typically, the surface layer is reddish brown very gravelly clay loam about 2 inches thick. The subsoil is reddish brown clay and clay loam about 13 inches thick. The substratum is reddish brown clay loam about 5 inches thick. Rhyolite is at a depth of 20 inches.

Permeability of the Lehmans soil is slow. Available water capacity is very low. Effective rooting depth is 6 to 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed basalt, andesite, rhyolite, tuff, and agglomerate.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

The Lehmans soil has moderate to high potential for producing forage. It responds well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Constructing livestock trails and permitting a large number of livestock to graze for short periods of time promote an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

If the soil in this unit is used as sites for buildings or roads, the main limitations are the depth to bedrock, slope, and shrink-swell potential. The cuts needed to provide nearly level building sites or roadbeds can expose bedrock that is difficult to excavate. Ripping or blasting, or both, may be necessary. The very shallow and shallow depth to bedrock also interferes with excavation for installing utilities. Because of the steepness of slope, extensive cutting and filling are

necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. Erosion can be controlled by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

The steeper areas of the Lehmans soil are subject to slippage when saturated. Water should be diverted away from buildings in these areas. The use of retaining walls or anchored footings also reduces the hazard of slippage.

The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has low shrink-swell potential. In addition, more reinforcement can be provided.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the depth to bedrock and slope. Septic tank absorption fields may not operate properly in some areas of this unit. The limited depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Steepness of slope makes it difficult to control the distribution of effluent. Effluent can move along the surface of the bedrock and seep to the surface in downslope areas, creating a hazard to health. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems. If the soil in this unit becomes saturated with water, slippage can occur in downslope areas.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Volcanic Hills, 10- to 12-inch p.z., range site.

73—Lehmans-Rock outcrop complex, low precipitation, 8 to 65 percent slopes. This map unit is on hill slopes and mountain slopes. Elevation is 1,800 to 4,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Lehmans very gravelly clay loam and 30 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils in drainageways, Eba and Pinaleno soils on foot slopes, and Greyeagle and Nickel soils in gently sloping areas between hills and mountains. Also included are small areas of exposed volcanic ash deposits and soils that have more rock fragments or lime than is typical for this Lehmans soil. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Lehmans soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from basalt, andesite, rhyolite, tuff, and agglomerate. Typically, the surface layer is reddish brown very gravelly clay loam about 2 inches thick. The subsoil is reddish brown clay and clay loam about 13 inches thick. The substratum is reddish brown clay loam 5 inches thick. Rhyolite is at a depth of 20 inches.

Permeability of the Lehmans soil is slow. Available water capacity is very low. Effective rooting depth is 6 to 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed basalt, andesite, rhyolite, tuff, and agglomerate.

This unit is used as rangeland and wildlife habitat.

The Lehmans soil has moderate to high potential for producing forage. It responds well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Constructing livestock trails and permitting a large number of livestock to graze for short periods of time promote an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Volcanic Hills, 8- to 10-inch p.z., range site.

74—Luke-Cipriano association, 1 to 15 percent slopes. This map unit is on fan terraces. The Luke soil dominantly has slopes of 1 to 8 percent, and the Cipriano soil dominantly has slopes of 1 to 15 percent. In some areas, however, slopes are as much as 25 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Luke very gravelly sandy clay loam and 35 percent Cipriano very gravelly loam. The Luke soil is dominantly on the tops of terraces, and the Cipriano soil is dominantly on the sides of terraces.

Included in this unit are small areas of Beardsley, Contine, Ebon, Pinamt, and Suncity soils dominantly on the tops of terraces, Gunsight soils on the sides of terraces, and Carrizo soils in drainageways. The included

areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Luke soil is moderately deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish red very gravelly sandy clay loam about 1 inch thick. The upper 1 inch of the subsoil is yellowish red very gravelly sandy clay, and the lower 26 inches is red very gravelly and extremely gravelly clay. The next layer is a pink, silica-cemented hardpan about 6 inches thick. Below this to a depth of 60 inches or more is pink, weakly cemented to strongly cemented material that crushes to extremely gravelly loamy sand. Depth to the hardpan ranges from 20 to 40 inches. In some areas a hardpan is at a depth of 10 to 20 inches.

Permeability of the Luke soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the Cipriano soil is light brown, calcareous very gravelly loam about 6 inches deep over a silica-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Luke soil has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

The Cipriano soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil.

This map unit is in capability subclass VIIs, nonirrigated. The Luke soil is in the Clay Loam Upland, 7- to 10-inch p.z., range site, and the Cipriano soil is in the Limy Upland, 7- to 10-inch p.z., range site.

75—Mohall loam. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is pinkish gray loam about 2 inches thick. The subsurface layer is light yellowish brown loam about 5 inches thick. The upper 8 inches of the subsoil is brown, calcareous clay loam, and the lower 45 inches is yellowish brown, calcareous clay loam and brownish yellow, calcareous clay loam.

Included in this unit are small areas of Gilman and Glenbar soils on alluvial fans and flood plains and Contine and Tremant soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohall soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as irrigated cropland, for urban development, as rangeland, and as wildlife habitat.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts of 20 to 40 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis. An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the shrink-swell potential. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. The lower part of the subsoil is loam or sandy loam in some areas and is gravelly or very gravelly in other areas. If leach lines are placed at a depth of more than about 30 to 40 inches in these areas, permeability is not a limitation.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This unit has moderate potential for producing forage. It responds well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps

to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit in the Hassayampa Plain area and west of Tonopah receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Loamy Upland, 7- to 10-inch p.z., range site.

76—Mohall loam, calcareous solum. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is light brown, calcareous loam about 7 inches thick. The subsoil is reddish brown, calcareous clay loam 53 inches thick or more. Depth to the subsoil is less than 20 inches. In a few uncultivated areas, about 85 percent of the surface is covered with pebbles.

Included in this unit are small areas of Contine, Mohall, and Tremant soils on fan terraces and Antho, Estrella, and Valencia soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohall soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development and as irrigated cropland.

The Mohall soil has moderate potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the moderately slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. The lower part of the subsoil is loam or sandy loam in some areas and is gravelly or very gravelly in other areas. If leach lines are placed at a depth of more than about 30 to 40 inches in these areas, permeability is not a limitation.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts of more than 20 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Limy Fan, 7- to 10-inch p.z., range site.

77—Mohall clay loam. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is light brown clay loam about 2 inches thick. The upper 19 inches of the subsoil is light brown clay loam, and the lower 21 inches is light reddish brown and light brown, calcareous clay loam. The substratum to a depth of 60 inches or more is light reddish brown, calcareous extremely cobbly loamy sand.

Included in this unit are small areas of Gilman and Glenbar soils on alluvial fans and Contine and Tremant soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohall soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. A few areas of this soil in the General Motors proving grounds area are subject to rare periods of flooding.

This unit is used as irrigated cropland, as rangeland, as wildlife habitat, and for urban development.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts of 20 to 40 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus

trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

The soil in this unit has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the moderately slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. The substratum is loam or sandy loam in some areas and is gravelly or very gravelly in other areas. If leach lines are placed at a depth of more than about 30 to 40 inches in these areas, permeability is not a limitation.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Clay Loam Upland, 7- to 10-inch p.z., range site.

78—Mohall clay loam, calcareous solum. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is reddish yellow and pink, calcareous clay loam about 6 inches thick. The upper 8 inches of the subsoil is light reddish brown, calcareous clay loam, and the lower 46 inches or more is pink and pinkish white, calcareous clay loam. Depth to the subsoil is less than 20 inches.

Included in this unit are small areas of Contine, Mohall, and Tremant soils on fan terraces and Antho, Estrella, and Valencia soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohall soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland, as wildlife habitat, and for urban development. A few areas are used for irrigated cropland.

The soil in this unit has moderate potential for producing forage. It responds slowly to rangeland mangement. Most of the vegetation is produced following rainfall in winter and spring.

A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit. A few small areas in the Hassayampa Plain area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the moderately slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. The lower part of the subsoil is loam or sandy loam in some areas and is gravelly or very gravelly in other areas. If leach lines are placed at a depth of more than about 30 to 40 inches in these areas, permeability is not a limitation.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

If the soil in this unit is used as irrigated cropland, it has few limitations. Leveling cuts of more than 20 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and

increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Limy Fan, 7- to 10-inch p.z., range site.

79—Mohall clay. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is reddish brown, calcareous clay about 12 inches thick. The upper 20 inches of the subsoil is light reddish brown calcareous clay loam, and the lower 28 inches is light reddish brown, calcareous clay loam. In some areas this soil is affected by salts and sodium.

Included in this unit are small areas of Gilman and Glenbar soils on alluvial fans and Contine and Tremant soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohall soil is slow in the surface layer and moderately slow below the surface layer. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as irrigated cropland and for urban development.

If the soil in this unit is used as irrigated cropland, the main limitation is the slow water intake rate. The design of the irrigation system should insure that water adequately permeates the soil. This soil should be irrigated separately from adjacent soils that have a higher water intake rate, and it should be irrigated at a lower application rate. Sprinkler irrigation systems are not well suited to this soil because of its slow water intake rate. Basin irrigation generally is an efficient system for insuring adequate infiltration. In the more sloping areas, moving the amount of soil material needed to level fields may not be feasible. Use of a graded system is more feasible in such areas.

Leveling cuts of 20 to 40 inches generally expose concentrations of lime. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis. An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made.

It is necessary to leach salts out of the root zone every year to prevent buildup of salts in the soil, particularly where graded irrigation systems are used. Leaching is especially critical where water quality is poor. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth. A plowpan develops easily in this soil; therefore, it should not be tilled when wet. Varying the plowing depth helps to keep a plowpan from developing.

If the soil in this unit is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The effects of shrinking and swelling on building foundations can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential. In addition, more reinforcement can be provided.

If the soil in this unit is used for septic tank absorption fields, the main limitation is the moderately slow permeability. This limitation can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material. The lower part of the subsoil is loam or sandy loam in some areas and is gravelly or very gravelly in other areas. If leach lines are placed at a depth of more than about 30 to 40 inches in these areas, permeability is not a limitation.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated.

80—Mohall-Tremant complex, 1 to 8 percent slopes. This map unit is on fan terraces. Elevation is 1,100 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Mohall loam and 25 percent Tremant gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Contine, Pinamt, and Suncity soils on the tops of terraces; Gunsight and Rillito soils on side slopes; and Antho, Carrizo, and Valencia soils on flood plains. The included areas make up about 30 percent of the total acreage. The percentage varies from one area to another.

The Mohall soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown loam about 2 inches thick. The upper 29 inches of the subsoil is light brown and light reddish brown, calcareous clay loam, and the lower 11 inches is light brown, calcareous clay loam. The substratum to a depth of 60 inches or more is light reddish brown, calcareous extremely cobbly

loamy sand. In a few areas about 85 percent of the surface is covered with pebbles.

Permeability of the Mohall soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish brown gravelly loam about 1 inch thick. The upper 4 inches of the subsoil is reddish yellow sandy clay loam, and the lower 24 inches is reddish yellow and yellowish red, calcareous gravelly sandy clay loam and gravelly clay loam. The substratum to a depth of 60 inches or more is white, calcareous gravelly sand. In a few areas about 85 percent of the surface is covered with pebbles. In some areas the soil is calcareous throughout.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit have moderate potential for producing forage. They respond moderately well to rangeland management. Where the range is in good or excellent condition, the soils produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In some areas of the Tremant soil, the surface layer is calcareous and the soil is less productive than it is in most other areas.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Loamy Upland, 7- to 10-inch p.z., range site.

81—Mohall-Tremant complex, low precipitation, 1 to 8 percent slopes. This map unit is on fan terraces. Elevation is 1,100 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Mohall loam and 25 percent Tremant gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Contine, Pinamt, and Suncity soils on the tops of terraces, Gunsight and Rillito soils on side slopes, and Antho, Carrizo, and Valencia soils on flood plains. The included areas make up about 30 percent of the total acreage. The percentage varies from one area to another.

The Mohall soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown loam about 2 inches thick. The upper 29 inches of the subsoil is light brown and light reddish brown, calcareous clay loam, and the lower 11 inches is light brown, calcareous clay loam. The substratum to a depth of 60 inches or more is light reddish brown, calcareous extremely cobbly loamy sand. In a few areas about 85 percent of the surface is covered with pebbles.

Permeability of the Mohall soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish brown gravelly loam about 1 inch thick. The upper 4 inches of the subsoil is reddish yellow sandy clay loam, and the lower 24 inches is reddish yellow and yellowish red, calcareous gravelly sandy clay loam and gravelly clay loam. The substratum to a depth of 60 inches or more is white, calcareous gravelly sand. In a few areas, about 85 percent of the surface layer is covered with pebbles. In some areas the soil is calcareous throughout.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Mohall soil has moderate potential for producing forage, and the Tremant soil has low potential. The soils respond moderately well to rangeland management. Where the range is in good or excellent condition, the soils produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In some areas of the Tremant soil, the surface layer is calcareous and the soil is less productive than it is in most other areas.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Loamy Upland, 2- to 7-inch p.z., range site.

82—Mohave sandy loam. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is light brown sandy loam about 2 inches thick. The upper 9 inches of the subsoil is yellowish red clay loam, and the lower 9 inches is yellowish red, calcareous clay loam. The upper 15 inches of the substratum is light brown, calcareous loam, and the lower part to a depth of 60 inches or more is light brown, calcareous loam.

Included in this unit are small areas of Gila soils on flood plains and Continental and Tres Hermanos soils on fan terraces. Also included are small areas of soils that

are stratified clay loam throughout. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used as irrigated cropland.

This unit has moderate potential for producing forage. It responds well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If this unit is used as irrigated cropland, it has few limitations. Because of the limited available water capacity of the surface layer, light and frequent irrigations are needed when plants are young. Leveling cuts of 20 to 40 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Application of manure or cotton gin trash or plowing under crop residue or green manure crops increases the available water capacity and improves tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Loamy Upland, 8- to 10-inch p.z., range site.

83—Mohave loam. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is light brown loam about 2 inches thick. The upper 9 inches of the subsoil is yellowish red clay loam, and the lower 9 inches is yellowish red, calcareous clay loam. The upper 15 inches of the substratum is light brown, calcareous loam, and the lower part to a depth of 60 inches or more is light brown, calcareous loam.

Included in this unit are small areas of Gila soils on flood plains and Continental and Tres Hermanos soils on fan terraces. Also included are small areas of soils that are stratified clay loam throughout. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, wildlife habitat, and irrigated cropland.

This unit has moderate potential for producing forage. It responds well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts of 20 to 40 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Loamy Upland, 8- to 10-inch p.z., range site.

84—Mohave loam, calcareous solum. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is light brown, calcareous loam about 2 inches thick. The subsoil is reddish brown, calcareous clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam. In a few uncultivated areas, about 85 percent of the surface is covered with pebbles.

Included in this unit are small areas of Mohave, Continental, and Tres Hermanos soils on fan terraces and Anthony and Guest soils on flood plains. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used as irrigated cropland.

This unit has moderate potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts of less than 20 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Limy Fan, 8- to 10-inch p.z., range site.

85—Mohave clay loam. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 64 to 70 degrees F.

Typically, the surface layer is light brown clay loam about 2 inches thick. The upper 9 inches of the subsoil is yellowish red clay loam, and the lower 9 inches is yellowish red, calcareous clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam.

Included in this unit are small areas of Gila soils on flood plains and Continental and Tres Hermanos soils on fan terraces. Also included are small areas of soils that are stratified clay loam throughout. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used as rangeland, wildlife habitat, and irrigated cropland.

This unit has moderate potential for producing forage. It responds moderately well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts of 20 to 40 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Clay Loam Upland, 8- to 10-inch p.z., range site.

86—Mohave clay loam, calcareous solum. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is brown, calcareous clay loam about 2 inches thick. The upper 3 inches of the subsoil is brown, calcareous clay loam, and the lower 10 inches is dark brown, calcareous clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous clay loam.

Included in this unit are small areas of Anthony and Gila soils on flood plains and Tres Hermanos, Mohave, and Continental soils on fan terraces. Also included are small areas of soils that have a reddish brown, calcareous clay loam subsoil at a depth of 20 to 40 inches. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, wildlife habitat, and irrigated cropland.

This unit has moderate potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit.

If this unit is used as irrigated cropland, it has few limitations. Leveling cuts of more than 20 inches generally expose concentrations of lime. Applications of manure or cotton gin trash are beneficial in these areas. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis.

An onsite investigation is advisable before irrigation systems are planned and leveling cuts are made. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

This map unit is in capability class I, irrigated, and in capability subclass VIIc, nonirrigated. It is in the Limy Fan, 8- to 10-inch p.z., range site.

87—Mohave complex. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Mohave sandy loam and 40 percent Mohave gravelly sandy loam, calcareous solum. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of soils in swales that are similar to the Mohave soils but are occasionally ponded. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Mohave sandy loam is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 2 inches thick. The upper 9 inches of the subsoil is yellowish red clay loam, and the lower 9 inches is yellowish red, calcareous clay loam. The substratum to a depth of 60 inches or more is light brown calcareous loam. In some areas the surface layer is gravelly sandy loam.

Permeability of the Mohave sandy loam is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Mohave gravelly sandy loam, calcareous solum, is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown, calcareous gravelly sandy loam about 2 inches thick. The upper 3 inches of the subsoil is brown, calcareous clay loam, and the lower 10 inches is dark brown, calcareous clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous clay loam. In some areas the surface layer is sandy loam or loam.

Permeability of the Mohave gravelly sandy loam, calcareous solum, is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Mohave sandy loam has moderate potential for producing forage. It responds well to rangeland management and can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

The Mohave gravelly sandy loam, calcareous solum, has moderate potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year. A few areas of this soil are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the soil.

This map unit is in capability subclass VIIc, nonirrigated. The Mohave sandy loam is in the Loamy Upland, 8- to 10-inch p.z., range site, and the Mohave gravelly sandy loam, calcareous solum, is in the Limy Fan, 8- to 10-inch p.z., range site.

88—Mohave-Guest complex. This map unit is on fan terraces and associated flood plains. Slope is 0 to 1 percent. Elevation is 2,200 to 2,400 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Mohave sandy loam and 40 percent Guest clay loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Mohave soils, calcareous solum, and Continental soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Mohave soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 2 inches thick. The upper 9 inches of the subsoil is yellowish red clay loam, and the lower 9 inches is yellowish red, calcareous clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam. In some areas the surface layer is gravelly sandy loam.

Permeability of the Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth

is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Guest soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown clay loam about 2 inches thick. The upper 37 inches of the substratum is brown, calcareous clay, and the lower part to a depth of 60 inches or more is light brown, calcareous clay loam. In some areas this soil is noncalcareous to a depth of 35 inches or more.

Permeability of the Guest soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. This soil receives additional moisture from adjacent areas, and it is subject to ponding following prolonged, high intensity storms. Where unprotected, this soil is subject to rare periods of flooding. Some overgrazed areas have actively eroding gullies 1 foot to 4 feet deep.

This unit is used as rangeland and wildlife habitat.

The Mohave soil has moderate potential for producing forage. It responds well to rangeland management. This soil can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

The Guest soil is one of the most productive rangeland soils in the survey area. It receives extra water from runoff, which increases production. The soil responds well to rangeland management. It can produce forage year round, and it is easily traversed by cattle.

Because of the availability of water, ease of access, and abundance of feed, some areas of this soil are overgrazed. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season. Grazing should be delayed until the soil is sufficiently drained and is firm enough to withstand trampling by livestock. If the plant cover is disturbed, the soil should be protected from flooding to control gullying, streambank cutting, and sheet erosion.

Construction of livestock watering ponds on this unit contribute to the drying of areas that previously were subject to flooding. This type of water development should be constructed at the distal end of bottom land areas.

In areas that have been invaded by woody species, the productivity of the soil in this unit can be improved by prescribed burning or by chemical or mechanical treatment of the brush. Other types of land uses should be considered in selecting a method of brush control.

This map unit is in capability subclass VIIs, nonirrigated. The Mohave soil is in the Loamy Upland, 8- to 10-inch p.z., range site, and the Guest soil is in the Clayey Bottom, 8- to 10-inch p.z., range site.

89—Mohave-Tres Hermanos complex, 1 to 8 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 50 percent Mohave clay loam and 30 percent Tres Hermanos gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo and Anthony soils in drainageways and Continental and Pinaleno soils on fan terraces. Also included are small areas of soils that have a buried, reddish brown clay loam subsoil below a depth of 20 to 40 inches. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Mohave soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown clay loam about 2 inches thick. The upper 9 inches of the subsoil is yellowish red clay loam, and the lower 9 inches is yellowish red, calcareous clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam.

Permeability of the Mohave soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Tres Hermanos soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow gravelly loam about 2 inches thick. The subsoil is reddish yellow, yellowish red, and pink, calcareous gravelly clay loam about 18 inches thick. The substratum to a depth of 60 inches or more is white, calcareous very gravelly loam.

Permeability of the Tres Hermanos soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit have moderate potential for producing forage. They respond well to rangeland management. They can produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In a few areas the Tres Hermanos soil is calcareous in the surface layer and is therefore less productive than it is in most other areas of the soil.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Loamy Upland, 8- to 10-inch p.z., range site.

90—Momoli gravelly sandy loam, 1 to 5 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is strong brown gravelly sandy loam about 3 inches thick. The subsoil is strong brown very gravelly sandy loam about 23 inches thick. The substratum to a depth of 60 inches or more is brown, calcareous very gravelly sandy loam.

Included in this unit are small areas of Carrizo and Maripo soils on flood plains and Pinamt and Denure soils on fan terraces. The included areas make up about 30 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Momoli soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

The soil in this unit has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

If this unit is used as sites for buildings, roads, or septic tank absorption fields, it has few limitations. Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Sandy Loam Upland, 7- to 10-inch p.z., range site.

91—Momoli-Carrizo complex. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Momoli very gravelly sandy loam and 35 percent Carrizo very gravelly sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Mohall, Tremant, Gunsight, and Chuckawalla soils on slightly higher terraces, Denure soils scattered throughout the unit, and Gilman, Maripo, and Carrizo soils on flood plains and in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The soils in some areas of this unit south of Pinnacle Peak and west of the McDowell Mountains are noncalcareous to a depth of 20 inches or more. The soils in these areas typically are extremely cobbly or extremely gravelly.

The Momoli soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray, calcareous very gravelly sandy loam about 1 inch thick. Below this to a depth of 60 inches or more is light brown, calcareous very gravelly sandy loam. In some areas this soil is noncalcareous to a depth of 15 inches or more.

Permeability of the Momoli soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray, calcareous very gravelly sandy loam about 2 inches thick. The upper 9 inches of the underlying material is light brown, calcareous very gravelly sandy loam, and the lower part to a depth of 60 inches or more is brown, calcareous extremely gravelly loamy sand. In some areas this soil is noncalcareous to a depth of 15 inches or more.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit have moderate potential for producing forage. They respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year. In some areas of this unit, west of the McDowell Mountains and south of the Vulture Mountains, the soils are noncalcareous in the surface layer and are therefore more productive than they are in most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in Limy Fan, 7- to 10-inch p.z., range site.

92—Momoli-Carrizo complex, low precipitation. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Momoli very gravelly sandy loam and 35 percent Carrizo very gravelly sandy loam. The components of this unit are so intricately

intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Mohall, Tremant, Gunsight, and Chuckawalla soils on slightly higher terraces, Denure soils scattered throughout the unit, and Gilman, Maripo, and Carrizo soils on flood plains and in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Momoli soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray, calcareous very gravelly sandy loam about 1 inch thick. Below this is light brown, calcareous very gravelly sandy loam to a depth of 60 inches or more. In some areas this soil is noncalcareous to a depth of 15 inches or more.

Permeability of the Momoli soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Carrizo soil is deep and excessively drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray, calcareous very gravelly sandy loam about 2 inches thick. The upper 9 inches of the underlying material is light brown, calcareous very gravelly sandy loam, and the lower part to a depth of 60 inches or more is brown, calcareous extremely gravelly loamy sand. In some areas this soil is noncalcareous to a depth of 15 inches or more.

Permeability of the Carrizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit have low potential for producing forage. They respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year. In some areas of this unit, the soils are noncalcareous in the surface layer and are more productive than they are in most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Fan, 2- to 7-inch p.z., range site.

93—Nickel-Cave complex, 8 to 30 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 50 percent Nickel gravelly sandy loam and 35 percent Cave gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo and Anthony soils in drainageways and Pinaleno and Greyeagle soils on fan terraces. Also included are a few areas of soils that have slopes of less than 8 percent. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Nickel soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray, calcareous gravelly sandy loam about 1 inch thick. The upper 9 inches of the underlying material is pinkish gray, calcareous gravelly loam, the next 40 inches is pinkish gray, calcareous very gravelly sandy loam, and the lower part to a depth of 60 inches or more is white, calcareous very gravelly loamy sand.

Permeability of the Nickel soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Cave soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous gravelly loam about 1 inch thick. The next layer is pinkish gray, calcareous loam about 13 inches thick over a pinkish white, lime-cemented hardpan that is about 6 inches thick. Below this to a depth of 60 inches or more is pinkish white, calcareous very gravelly sandy loam.

Permeability of the Cave soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

The Nickel soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Fencing and developing watering facilities help to control grazing.

The Cave soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the cemented hardpan in the Cave soil and slope. The Nickel soil is better suited to use as sites for buildings and roads than is the Cave soil; therefore, buildings and roads should be located in areas of the Nickel soil if feasible. The cuts needed to provide nearly level building sites or roadbeds can expose a hardpan that may be difficult to excavate. Ripping the pan may be necessary. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas

should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. The risk of erosion can be reduced by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the cemented hardpan in the Cave soil and slope. Absorption fields should be located in areas of the Nickel soil if feasible. The hardpan restricts the movement of effluent. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the limited soil depth, the size of absorption fields may have to be increased. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable adjacent areas or installing community sewage systems. Steepness of slope makes it difficult to control the distribution of effluent. Effluent distributed into the soil on the steeper slopes can seep to the surface downslope. Absorption lines should be placed on the contour to slow the flow of effluent and produce more uniform distribution. To achieve the deepest possible infiltration and minimize downslope seepage, absorption lines should be placed at a greater depth in the steeper areas than in the more nearly level areas.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Nickel soil is in the Limy Slopes, 10- to 12-inch p.z., range site, and the Cave soil is in the Limy Upland, 10- to 12-inch p.z., range site.

94—Nickel-Cave complex, low precipitation, 8 to 30 percent slopes. This map unit is on fan terraces. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 50 percent Nickel gravelly sandy loam and 35 percent Cave gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo and Anthony soils in drainageways and Pinaleno and Greyeagle soils on fan terraces. Also included are a few areas of soils that have slopes of less than 8 percent. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Nickel soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray, calcareous very gravelly sandy loam about 1 inch thick. The upper 9 inches of the underlying material is pinkish gray, calcareous gravelly loam, the next 40 inches is pinkish gray, calcareous very gravelly sandy loam, and the lower part to a depth of 60 inches or more is white, calcareous very gravelly loamy sand.

Permeability of the Nickel soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Cave soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous gravelly loam about 1 inch thick. The next layer is pinkish gray, calcareous loam about 13 inches thick over a pinkish white, lime-cemented hardpan about 6 inches thick. Below this to a depth of 60 inches or more is pinkish white, calcareous very gravelly sandy loam.

Permeability of the Cave soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

The Nickel soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Fencing and developing watering facilities help to control grazing.

The Cave soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the cemented hardpan in the Cave soil and slope. The Nickel soil is better suited to use as sites for buildings and roads than is the Cave soil; therefore, buildings and roads should be located in areas of the Nickel soil if feasible. The cuts needed to provide nearly level building sites or roadbeds can expose a hardpan that may be difficult to excavate. Ripping the pan may be necessary. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. The risk of erosion can be reduced by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the cemented hardpan in the Cave soil and slope. Absorption fields should be located in areas of the Nickel soil if feasible. The hardpan restricts the movement of effluent. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the limited soil depth, the size of absorption field may have to be increased. In

some are as the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more suitable adjacent areas or installing community sewage systems. Steepness of slope makes it difficult to control the distribution of effluent. Effluent distributed into the soil on the steeper slopes can seep to the surface downslope. Absorption lines should be placed on the contour to slow the flow of effluent and produce more uniform distribution. To achieve the deepest possible infiltration and minimize downslope seepage, absorption lines should be placed at a greater depth in the steeper areas than in the more nearly level areas.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Nickel soil is in the Limy Slopes, 8- to 10-inch p.z., range site, and the Cave soil is in the Limy Upland, 8- to 10-inch p.z., range site.

95—Ohaco gravelly loam. This moderately deep and well drained soil is on stream terraces and fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is brown gravelly loam about 2 inches thick. The upper 9 inches of the subsoil is yellowish red clay loam, and the lower 16 inches is yellowish red clay loam and clay. The substratum is pink gravelly sandy loam about 4 inches thick over a silica- and lime-cemented hardpan at a depth of about 31 inches. Depth to the hardpan ranges from 20 to 40 inches.

Included in this unit are small areas of Continental and Suncity Variant soils on fan terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Ohaco soil is slow. Available water capacity is high. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. It responds well to rangeland management. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Tobosa, the dominant forage species, is unpalatable when cured and should therefore be used during the growing season. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit, in the northwestern part of the survey area, receive less precipitation than is typical for the unit. These areas are somewhat less productive than are most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Clayey Upland, 10- to 12-inch p.z., range site.

96—Pinaleno-Tres Hermanos complex, 1 to 10 percent slopes. This map unit is on fan terraces. Elevation is 2,000 to 2,500 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Pinaleno very gravelly clay loam and 40 percent Tres Hermanos gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils in drainageways; Mohave, Greyeagle, Eba, Vado, and Nickel soils on fan terraces; and soils that have less gravel throughout the profile. Also included are small areas of soils that are stratified sandy loam, are in and adjacent to drainageways, and receive runoff from surrounding areas. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Pinaleno soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish red very gravelly clay loam about 1 inch thick. The upper 11 inches of the subsoil is yellowish red, calcareous gravelly clay loam and very gravelly clay loam, and the lower 12 inches is light brown, calcareous gravelly loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam. In some areas the surface layer is gravelly sandy loam. In some areas a buried soil is below the substratum.

Permeability of the Pinaleno soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Tres Hermanos soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow gravelly loam about 2 inches thick. The upper 4 inches of the subsoil is reddish yellow, calcareous clay loam, and the lower 16 inches is yellowish red, calcareous gravelly and very gravelly clay loam. The substratum to a depth of 60 inches or more is white, weakly lime-cemented or strongly lime-cemented very gravelly loam. In some areas the surface layer is gravelly sandy loam. In some areas this soil is noncalcareous to a depth of 10 inches or more.

Permeability of the Tres Hermanos soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for urban development.

The soils in this unit have moderate potential for producing forage. They respond well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Proper placement of fences and watering facilities helps to control the distribution of grazing. In some areas of this unit, the soils are calcareous in the surface layer and are therefore less productive than in most other areas of the unit.

If the Pinaleno soil is used as sites for buildings or roads, it has few limitations. If the Tres Hermanos soil is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The Pinaleno soil is better suited to use as sites for buildings and roads than is the Tres Hermanos soil; therefore, buildings and roads should be located in areas of the Pinaleno soil if feasible.

If the soils in this unit are used for septic tank absorption fields, they have few limitations. In a few areas the substratum is somewhat finer in texture than is typical, and in other areas the substratum is weakly cemented. The reduced permeability in these areas may require the use of larger absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and th e best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Pinaleno soil is in the Loamy Upland, 10- to 12-inch p.z., range site, and the Tres Hermanos soil is in the Sandy Loam Upland, 10- to 12-inch p.z., range site.

97—Pinaleno-Tres Hermanos complex, low precipitation, 1 to 10 percent slopes. This map unit is on fan terraces. Elevation is 2,000 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 45 percent Pinaleno very gravelly clay loam and 40 percent Tres Hermanos gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils in drainageways; Mohave, Greyeagle, Eba, Vado, and Nickel soils on fan terraces; and soils that have less gravel throughout the profile. Also included are small areas of soils that are stratified sandy loam, are in and adjacent to drainageways, and receive runoff from surrounding areas. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Pinaleno soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is yellowish red very gravelly clay loam about 1 inch thick. The upper 11 inches of the subsoil is yellowish red, calcareous gravelly clay loam and very gravelly clay loam, and the lower 12 inches is light brown, calcareous gravelly loam. The substratum to a depth of 60 inches or more is light brown, calcareous loam. In some areas the surface layer is gravelly sandy loam. In some areas a buried soil is below the substratum.

Permeability of the Pinaleno soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Tres Hermanos soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow gravelly loam about 2 inches thick. The upper 2 inches of the subsoil is reddish yellow, calcareous clay loam, and the lower 16 inches is yellowish red and pink, calcareous gravelly clay loam and very gravelly clay loam. The substratum to a depth of 60 inches or more is white, weakly lime-cemented or strongly lime-cemented very gravelly loam. In some areas the surface layer is gravelly sandy loam.

Permeability of the Tres Hermanos soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

This unit has moderate potential for producing forage. It responds well to rangeland management. The unit can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Proper placement of fences and watering facilities helps to control the distribution of grazing. In some areas of this unit, the soil is calcareous in the surface layer and is therefore less productive than in most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. The Pinaleno soil is in the Loamy Upland, 8- to 10-inch p.z., range site, and the Tres Hermanos soil is in the Sandy Loam Upland, 8- to 10-inch p.z., range site.

98—Pinamt-Tremant complex, 1 to 10 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Pinamt extremely gravelly sandy loam and 35 percent Tremant gravelly loam. The components of this unit are so intricately intermingled

that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils in drainageways and Chuckawalla, Ebon, Gunsight, and Rillito soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Pinamt soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 1 inch of the surface layer is brown, calcareous extremely gravelly sandy loam and the lower 2 inches is light brown, calcareous very gravelly loam. The upper 12 inches of the subsoil is yellowish red, calcareous very gravelly sandy clay loam, and the lower 13 inches is light brown, calcareous extremely gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous extremely gravelly sandy loam. In some areas this soil is noncalcareous to a depth of 60 inches or more.

Permeability of the Pinamt soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow gravelly loam 5 inches thick. The subsoil is reddish yellow and yellowish red, calcareous sandy clay loam and gravelly clay loam about 24 inches thick. The substratum to a depth of 60 inches or more is white, calcareous gravelly sand. In some areas this soil is noncalcareous to a depth of 60 inches or more, and in some areas it is calcareous throughout.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The Pinamt soil has low potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year. In some areas this soil is noncalcareous in the surface layer and is therefore more productive than in most other areas of the soil.

The Tremant soil has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In some areas this soil is calcareous in the surface layer and is therefore less. productive than in most other areas of the soil.

If the Pinamt soil is used as sites for buildings or roads, it has few limitations. If the Tremant soil is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below. The Pinamt soil is better suited to use as sites for buildings and roads than is the Tremant soil; therefore, buildings and roads should be located in areas of the Pinamt soil if feasible.

If the soils in this unit are used for septic tank absorption fields, they have few limitations. In a few areas the substratum is somewhat finer in texture than is typical for the soils, and in other areas the substratum is weakly cemented. The reduced permeability in these areas may require the use of larger absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Pinamt soil is in the Limy Fan, 7- to 10-inch p.z., range site, and the Tremant soil is in the Loamy Upland, 7- to 10-inch p.z., range site.

99—Pinamt-Tremant complex, low precipitation, 1 to 10 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Pinamt extremely gravelly sandy loam and 35 percent Tremant gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils in drainageways and Chuckawalla, Ebon, Gunsight, and Rillito soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Pinamt soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the upper 1 inch of the surface layer is brown, calcareous extremely gravelly sandy loam and the lower 2 inches is light brown, calcareous very gravelly loam. The upper 12 inches of the subsoil is yellowish red, calcareous very gravelly sandy clay loam, and the lower 13 inches is light brown, calcareous extremely gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light brown, calcareous extremely gravelly sandy loam. In some areas this soil is noncalcareous to a depth of 20 inches or more.

Permeability of the Pinamt soil is moderately slow. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow gravelly loam 5 inches thick. The subsoil is reddish yellow and yellowish red, calcareous sandy clay loam and gravelly clay loam about 24 inches thick. The substratum to a depth of 60 inches or more is white, calcareous gravelly sandy loam. In some areas the soil is calcareous throughout.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Pinamt soil has low potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year. In some areas this soil is noncalcareous in the surface layer and is therefore more productive than in most other areas of the soil.

The Tremant soil has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In some areas this soil is calcareous in the surface layer and is therefore less productive than in most other areas of the soil.

This map unit is in capability subclass VIIs, nonirrigated. The Pinamt soil is in the Limy Fan, 2- to 7-inch p.z., range site, and the Tremant soil is in the Loamy Upland, 2- to 7-inch p.z., range site.

100—Quilotosa-Vaiva-Rock outcrop complex, 20 to 65 percent slopes. This map unit is on mountain slopes and hill slopes. Elevation is 1,200 to 3,000 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 50 percent Quilotosa extremely gravelly sandy loam, 20 percent Vaiva extremely gravelly sandy loam, and 20 percent Rock outcrop. The Quilotosa soil is dominantly on mountain slopes, the Vaiva soil is on hill slopes that have slopes of less than 25 percent, and the Rock outcrop is scattered throughout the unit. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Schenco soils on mountain slopes. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Quilotosa soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from granite and gneiss. Typically, the surface is covered with gravel, cobbles, and stones. The surface layer is light brown extremely gravelly sandy loam about 2 inches thick. The upper 12 inches of the underlying material is light brown, calcareous extremely gravelly loam, and the lower part to a depth of 18 inches is calcareous, highly fractured granite overlying unweathered granite.

Permeability of the Quilotosa soil is moderately rapid. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

The Vaiva soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from granite and gneiss. Typically, the surface layer is brown very gravelly loam about 1 inch thick. The upper 2 inches of the subsoil is yellowish red very gravelly sandy loam, and the lower 8 inches is red, calcareous very gravelly sandy clay loam. Below the subsoil to a depth of 17 inches is highly fractured granite overlying unweathered granite.

Permeability of the Vaiva soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate.

Rock outcrop consists of exposed areas of granite and gneiss.

This unit is used as rangeland and wildlife habitat.

The Quilotosa and Vaiva soils have moderate potential for producing forage. They respond moderately well to rangeland mangement. They can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

If the soils in this unit are used as sites for buildings or roads, the main limitations are the depth to rock and slope. The cuts needed to provide nearly level building sites or roadbeds can expose bedrock that is difficult to excavate. Ripping or blasting, or both, may be necessary to remove bedrock to the desired depth. The very shallow and shallow depth to bedrock also interferes with excavation for installing utilities. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas.

Cuts and fills are highly susceptible to erosion. The risk of erosion can be reduced by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the depth to rock and slope. Septic tank absorption fields may not operate properly in some areas of this unit.The limited depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Steepness of slope makes it difficult to control the distribution of effluent. Effluent can move along the surface of the bedrock and seep to the surface in downslope areas, creating a hazard to health. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems. The use of septic tank absorption fields can create serious hazards in areas of the Vaiva soil. If the soil becomes saturated with water, slippage can occur in downslope areas.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Granitic Hills, 7- to 10-inch p.z., range site.

101—Rillito loam, 0 to 3 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,200 to 1,600 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the upper layer is light brown, calcareous loam about 11 inches thick. The next 13 inches is light brown, calcareous loam. The next 15 inches is light brown, calcareous, weakly lime- and silica-cemented gravelly loam. Below this to a depth of 60 inches or more is light brown, calcareous, weakly cemented extremely gravelly loam. In some areas the surface layer is gravelly loam. In a few areas the profile has slightly less gravel than is typical for this soil. Depth to the weakly cemented substratum ranges from 20 to 40 inches. Many of the pebbles in the soil are lime- and silica-cemented.

Included in this unit are small areas of Cipriano, Gunsight, Mohall, and Tremant soils on fan terraces and Gilman soils on flood plains. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Rillito soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as irrigated cropland, as wildlife habitat, as rangeland, and for urban development.

If this unit is used as irrigated cropland, the main limitation is the depth to the weakly lime- and silica-cemented, gravelly substratum. Leveling cuts of 20 to 40 inches generally will expose the substratum. Applications of manure or cotton gin trash are beneficial in leveled areas where cuts have exposed concentrations of lime. Phosphorus should be applied in split applications in such areas because it is readily tied up in the soil. Citrus trees, sorghum, and sudangrass in these limy areas are subject to chlorosis. Lining irrigation ditches with concrete reduces loss of water by seepage. Applying manure or cotton gin trash or plowing under crop residue or green manure crops improves tilth and increases the water intake rate. Keeping tillage to a minimum also helps to maintain soil tilth.

The Rillito soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil. The included Gilman soils on flood plains are much more productive than are the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

If the soil in this unit is used as sites for buildings, roads, or septic tank absorption fields, it has few limitations. In a few areas the substratum is more strongly cemented than is typical for the soil. In these areas excavations may be limited and permeability may be a concern.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclasses IIs, irrigated, and VIIs, nonirrigated. It is in the Limy Upland, 7- to 10-inch p.z., range site.

102—Rillito gravelly loam, 1 to 8 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 1,100 to 1,800 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the upper layer of this soil is pinkish gray, calcareous gravelly loam about 14 inches thick. Below this to a depth of 60 inches or more is pinkish white, calcareous gravelly loam. In some areas the upper layer is loam or very gravelly loam. In a few areas the profile has slightly less gravel than is typical for this soil.

Included in this unit are small areas of Mohall, Pinamt, and Tremant soils on the tops of terraces; Gunsight and Cipriano soils scattered throughout the unit; Gilman, Antho, and Maripo soils on flood plains; and Carrizo soils in drainageways. The included areas make up about 30

percent of the total acreage. The percentage varies from one area to another.

Permeability of this Rillito soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Rillito soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of this soil. The included soils in drainageways are much more productive than the other soils in the unit. Management of the soils in this unit therefore should be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 2- to 7-inch p.z., range site.

103—Rock outcrop-Gachado complex, 5 to 55 percent slopes. This map unit is on mountain slopes. Elevation is 1,200 to 3,000 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 65 percent Rock outcrop and 25 percent Gachado very gravelly loam. The Rock outcrop is on exposed dikes, ledges, and escarpments, and the Gachado soil is on mountain slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Lomitas soils on mountain slopes. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Rock outcrop consists of exposed areas of andesite, rhyolite, and tuff.

The Gachado soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from andesite, rhyolite, and tuff. Typically, the surface layer is light brown very gravelly loam about 1 inch thick. The subsoil is brown very gravelly clay loam about 6 inches thick. Bedrock is at a depth of 7 inches.

Permeability of the Gachado soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The Gachado soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Volcanic Hills, 7- to 10-inch p.z., range site.

104—Rock outcrop-Lehmans complex, 15 to 65 percent slopes. This map unit is on hill slopes and mountain slopes. Elevation is 1,800 to 4,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 60 percent Rock outcrop and 20 percent Lehmans very gravelly clay loam. The Rock outcrop generally is on mountaintops and the upper part of mountain slopes, and in some areas vertical exposures are common. The Lehmans soil is on the lower part of mountain slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils in drainageways and Eba and Pinaleno soils on foot slopes. Also included are small areas of exposed volcanic ash deposits and soils that have more rock fragments or lime than is typical for the Lehmans soil. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Rock outcrop consists of exposed areas of basalt, andesite, rhyolite, tuff, and agglomerate.

The Lehmans soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from basalt, andesite, rhyolite, tuff, and agglomerate. The surface layer is reddish brown very gravelly clay loam about 2 inches thick. The subsoil is reddish brown clay and clay loam about 13 inches thick. The substratum is reddish brown very gravelly clay loam 5 inches thick over bedrock.

Permeability of the Lehmans soil is slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The Lehmans soil has moderate to high potential for producing forage. It responds well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Volcanic Hills, 10- to 12-inch p.z., range site.

105—Rock outcrop-Lehmans complex, low precipitation, 15 to 65 percent slopes. This map unit is on hill slopes and mountain slopes. Elevation is 1,800 to 4,000 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 60 percent Rock outcrop and 20 percent Lehmans very gravelly clay loam. The Rock outcrop generally is on mountaintops and the upper part of mountain slopes, and in some areas vertical exposures are common. The Lehmans soil is on the lower part of mountain slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils in drainageways and Eba and Pinaleno soils on foot slopes. Also included are small areas of exposed volcanic ash deposits and soils that have more rock fragments or lime than is typical for the Lehmans soil. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Rock outcrop consists of exposed areas of basalt, andesite, rhyolite, tuff, and agglomerate.

The Lehmans soil is very shallow and shallow and is well drained. It formed in alluvium and colluvium derived dominantly from basalt, andesite, rhyolite, tuff, and agglomerate. The surface layer is reddish brown very gravelly clay loam about 2 inches thick. The subsoil is reddish brown clay and clay loam about 13 inches thick. The substratum is reddish brown very gravelly clay loam 5 inches thick over bedrock.

Permeability of the Lehmans soil is slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The Lehmans soil has moderate potential for producing forage. It responds well to rangeland management. It can produce forage year round. Steepness of slope, the areas of Rock outcrop, and cobbles and stones on the surface limit use. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Volcanic Hills, 8- to 10-inch p.z., range site.

106—Sal-Cipriano complex, 1 to 10 percent slopes. This map unit is on fan terraces. The Sal soil has slopes of 1 to 3 percent, and the Cipriano soil has slopes of 1 to 10 percent. Elevation is 1,200 to 1,600 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 50 percent Sal extremely gravelly loam and 30 percent Cipriano very gravelly sandy loam. The Sal soil is on the tops of terraces, and the Cipriano soil is on side slopes and in areas on the tops of terraces that do not have a desert pavement. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Gunsight and Rillito soils on the steeper parts of side slopes and Brios and Carrizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Sal soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, 70 to 90 percent of the surface is covered with varnished desert pavement. The surface layer is light brown, calcareous extremely gravelly loam about 2 inches thick. The upper 5 inches of the subsoil is yellowish red, saline very gravelly clay loam, and the lower 13 inches is yellowish red, saline extremely gravelly clay loam. A pinkish white and pink, silica-cemented hardpan is at a depth of 20 inches.

Permeability of the Sal soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is rapid, and the hazard of water erosion is slight.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow, calcareous very gravelly sandy loam about 1 inch thick. The upper 8 inches of the underlying material is reddish yellow, calcareous gravelly sandy loam, and the lower part to a depth of 20 inches is reddish yellow, calcareous very gravelly sandy loam. A silica-cemented hardpan is at a depth of 20 inches.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils. The included Brios and Carrizo soils in drainageways are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. The Sal soil is in the Saline Upland (Loamy), 7- to 10-inch p.z., range site, and the Cipriano soil is in the Limy Upland, 7- to 10-inch p.z., range site.

107—Sal-Cipriano complex, low precipitation, 1 to 10 percent slopes. This map unit is on fan terraces. The Sal soil has slopes of 1 to 3 percent, and the Cipriano soil has slopes of 1 to 10 percent. Elevation is 1,200 to 1,600 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 50 percent Sal extremely gravelly loam and 30 percent Cipriano very gravelly sandy loam. The Sal soil is on the tops of terraces, and the Cipriano soil is on the steeper side slopes and in areas on the tops of terraces that do not have a desert pavement. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Gunsight and Rillito soils on the steeper parts of the side slopes and Brios and Carrizo soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Sal soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, 70 to 95 percent of the surface is covered with varnished desert pavement. The surface layer is light brown, calcareous extremely gravelly loam about 2 inches thick. The upper 5 inches of the subsoil is yellowish red, saline very gravelly clay loam, and the lower 13 inches is yellowish red, saline extremely gravelly clay loam. A silica-cemented hardpan is at a depth of 20 inches.

Permeability of the Sal soil is moderately slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is rapid, and the hazard of water erosion is slight.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow, calcareous very gravelly sandy loam about 1 inch thick. The upper 8 inches of the underlying material is reddish yellow, calcareous gravelly sandy loam, and the lower part to a depth of 20 inches is reddish yellow, calcareous very gravelly sandy loam. A silica-cemented hardpan is at a depth of 20 inches.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The soils in this unit are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils. The included Brios and Carrizo soils in drainageways are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. The Sal soil is in the Saline Upland (Loamy), 2- to 7-inch p.z., range site, and the Cipriano soil is in the Limy Upland, 2- to 7-inch p.z., range site.

108—Schenco-Rock outcrop complex, 3 to 25 percent slopes. This map unit is on mountain slopes and hill slopes (fig. 7). Elevation is 1,500 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 50 percent Schenco extremely channery loam and 30 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Antho soils in drainageways; Beardsley, Cherioni, Cipriano, Ebon, Gunsight, and Suncity soils on fan terraces; and Gachado soils on hill slopes. Also included are small areas of Quilotosa and Vaiva soils. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Schenco soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from schist. Typically, the surface layer is reddish brown, calcareous extremely channery loam about 2 inches thick. The subsoil is light reddish brown, calcareous very channery loam about 9 inches thick. Below the subsoil to a depth of 22 inches is highly fractured and partially weathered schist. In some areas this soil is noncalcareous throughout.

Permeability of this Schenco soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

Rock outcrop consists of exposed areas of granite, andesite, and vertically oriented schist.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The Schenco soil has moderate potential for producing forage. It responds moderately well to rangeland mangement. It can produce forage year round. Areas of this unit generally are not so steep and are easier for livestock to traverse than are other mountainous areas of the survey area. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

If the soil in this unit is used as sites for buildings or roads, the main limitations are the depth to rock and slope. The cuts needed to provide nearly level building

Figure 7.—An area of Schenco-Rock outcrop complex, 3 to 25 percent slopes. This shallow Schenco soil is in the Schist Hills range site.

sites or roadbeds can expose soft bedrock that is relatively easy to excavate. Hard rock may be encountered in some areas. In the steeper areas, extensive cutting and filling may be required to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. The risk of erosion can be reduced by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff. The soil in the steeper areas is subject to slippage when saturated. Water should be diverted away from buildings in these areas. The use of retaining walls or anchored footings also reduces the hazard of slippage.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the depth to rock and slope. Septic tank absorption fields may not operate properly in some areas of this unit. The shallow depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Effluent may saturate the soil to the surface in the nearly level areas, and it may seep to the surface downslope in the steeper areas. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems. If the soil becomes saturated with water, slippage can occur in downslope areas.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Schist Hills, 7- to 10-inch p.z., range site.

109—Schenco-Rock outcrop complex, 25 to 60 percent slopes. This map unit is on mountain slopes and hill slopes. Elevation is 1,500 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 55 percent Schenco extremely channery loam and 35 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Beardsley, Cipriano, Ebon, and Gunsight soils on fan terraces and Gachado soils on mountain slopes. Also included are small areas of Quilotosa and Vaiva soils and exposed volcanic ash deposits. The included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Schenco soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from schist. Typically, the surface layer is reddish brown, calcareous extremely channery loam about 2 inches thick. The subsoil is light reddish brown, calcareous very channery loam about 9 inches thick. Below the subsoil to a depth of 22 inches is highly fractured and partially weathered schist. In some areas this soil is noncalcareous throughout.

Permeability of this Schenco soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium to rapid, and the hazard of water erosion is slight.

Rock outcrop consists of exposed areas of granite, andesite, and vertically oriented schist.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The Schenco soil has moderate potential for producing forage. It responds moderately well to rangeland management. It can produce forage year round. Areas of this unit generally are not so steep and are easier for livestock to traverse than are other mountainous areas of the survey area. Fencing and developing watering facilities help to improve distribution of livestock. Permitting a large number of livestock to graze for short periods of time promotes an efficient distribution of livestock and use of available forage. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation.

If the soil in this unit is used as sites for buildings or roads, the main limitations are depth to rock and slope. The cuts needed to provide nearly level building sites or roadbeds can expose soft bedrock that is relatively easy to excavate. Hard rock may be encountered in some areas. Because of the steepness of slope, extensive cutting and filling are necessary to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. The risk of erosion can be reduced by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff. The soil in the steeper areas is subject to slippage when saturated. Water should be diverted away from buildings in these areas. The use of retaining walls or anchored footings also reduces the hazard of slippage.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the depth to rock and slope. Septic tank absorption fields may not operate properly in some areas of this unit. The shallow depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Steepness of slope makes it difficult to control the distribution of effluent. Effluent can move along the surface of the bedrock and seep to the surface in downslope areas, creating a hazard to health. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems. If the soil becomes saturated with water, slippage can occur in downslope areas.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Schist Hills, 7- to 10-inch p.z., range site.

110—Suncity-Cipriano complex, 1 to 7 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 55 percent Suncity gravelly loam and 30 percent Cipriano very gravelly loam (fig. 8). The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils in drainageways and Beardsley and Gunsight soils on fan terraces. Also included are small areas of Rock outcrop in drainageways. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Suncity soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown gravelly loam about 1 inch thick. The subsoil is light reddish brown, calcareous gravelly clay loam about 8 inches thick. A silica- and lime-cemented hardpan is at a depth of 9 inches.

Permeability of the Suncity soil is slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

The Cipriano soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly loam about 1 inch thick. The underlying material is light brown, calcareous very gravelly loam about 5 inches thick over a silica- and lime-cemented hardpan. In a few areas the profile has slightly less gravel than is typical for this soil.

Permeability of the Cipriano soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

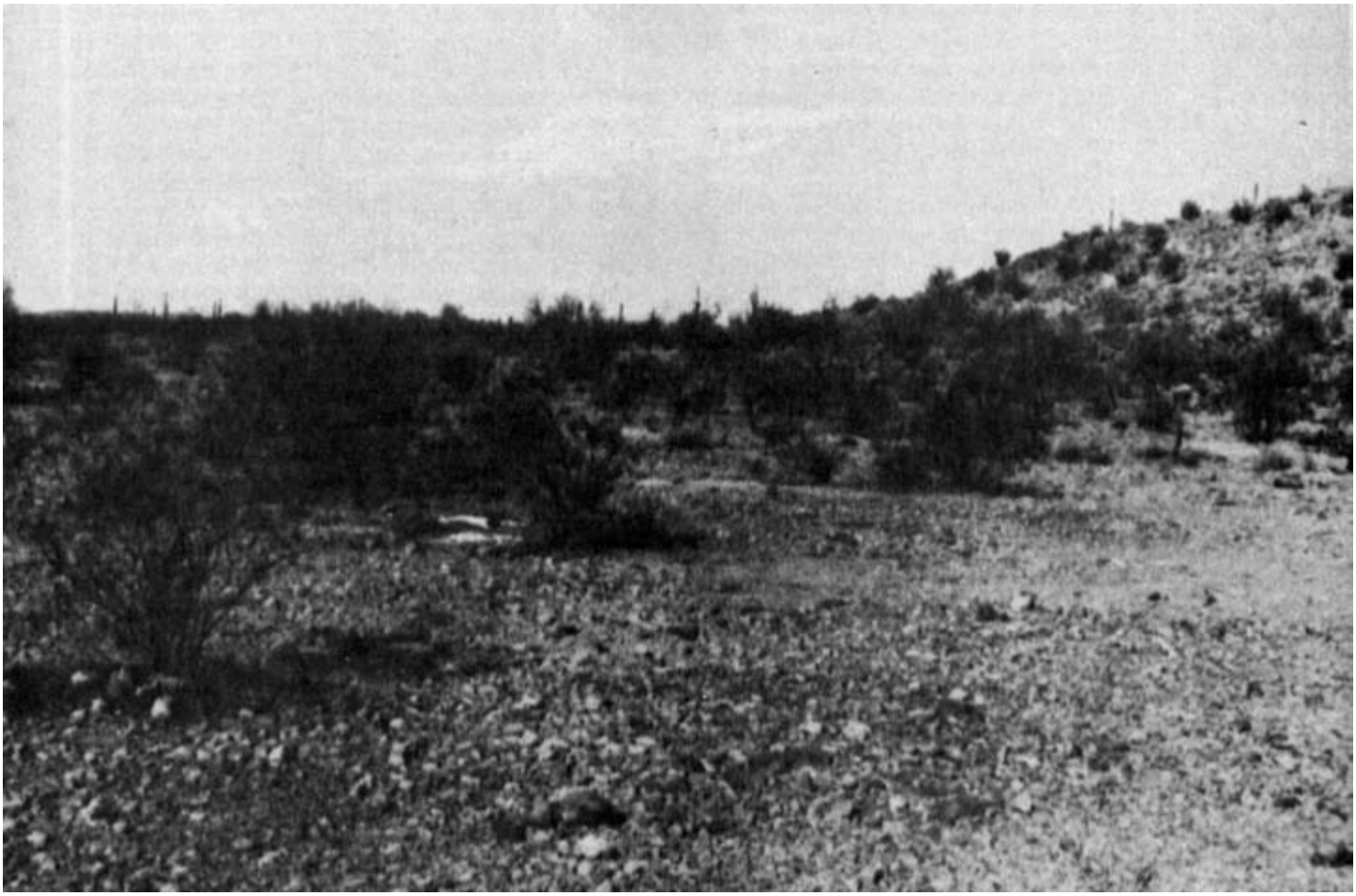

Figure 8.—An area of Suncity-Cipriano complex, 1 to 7 percent slopes, showing characteristic vegetation after heavy use. Suncity soil is in foreground.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The Suncity and Cipriano soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils. The included Carrizo soils in drainageways are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

In a few areas the Suncity soil is noncalcareous in the surface layer and is therefore more productive than in most other areas of the soil. A few small areas of this unit in the Hassayampa Plain area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soils in this unit are used as sites for buildings or roads, the main limitation is depth to the hardpan. The limited depth to the hardpan interferes with excavation. Ripping the pan may be necessary.

If the soils in this unit are used for septic tank absorption fields, the main limitation is depth to the hardpan. The hardpan restricts the movement of effluent. Effluent can move along the surface of the hardpan and seep to the surface in downslope areas, creating a hazard to health. Where the hardpan is thin and is underlain by more permeable material, the pan can be ripped and the absorption lines placed below it. Because of the shallow soil depth, the size of absorption fields may have to be increased. In some areas the size of the absorption field needed may exceed the lot size. Alternatives include locating absorption fields in more

suitable adjacent areas or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Limy Upland, 7- to 10-inch p.z., range site.

111—Torriorthents, 15 to 40 percent slopes. These deep and well drained soils are on the side slopes of fan terraces and stream terraces. They formed in alluvium derived dominantly from lacustrine deposits, volcanic ash, and acid and basic igneous rock. Slopes are formed by head cutting, undercutting by streams, and sloughing of sides. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

Included in this unit are small areas of calcareous soils on the uneroded or slightly eroded terrace ends and soils that are sandy loam, loam, or loamy sand and are in drainageways. The included areas make up about 10 percent of the total acreage.

Torriorthents are stratified loamy sand to clay.

Permeability of these Torriorthents is highly variable. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is high. The eroded condition of this unit is the result of normal geologic erosion. The unit is sharply dissected by intermittent drainageways that generally are at right angles to the terraces.

This unit is used as rangeland and wildlife habitat.

Torriorthents are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The management of the soils in this unit should be concerned mainly with managing the included soils in drainageways, because they produce nearly all the available forage. The present vegetation in most areas is widely scattered trees and creosotebush and other shrubs.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Breaks, 10- to 12-inch p.z., range site.

112—Tremant gravelly sandy loams. These deep and well drained soils are on fan terraces. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 65 percent of the soil in this unit is Tremant gravelly sandy loam that is noncalcareous in the upper 9 inches and is calcareous below, and 15 percent is Tremant gravelly sandy loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Tremant soils is light reddish brown gravelly sandy loam about 1 inch thick. The upper 8 inches of the subsoil is light reddish brown gravelly sandy loam, and the lower 32 inches is light reddish brown gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light reddish brown gravelly sand.

Included in this unit are small areas of Antho, Carrizo, and Valencia soils on bottoms and Carrizo, Denure, Mohall, Momoli, Pinamt, and Rillito soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Tremant soils is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

In areas where the soil is noncalcareous in the upper 9 inches, it has moderate potential for producing forage and responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

In areas where the soil is calcareous throughout, it has moderate potential for producing forage and responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the soils in this unit are used for septic tank absorption fields, they have few limitations. In a few areas the substratum is somewhat finer in texture than is typical for these soils, and in other areas the substratum is weakly cemented. The reduced permeability in these areas may require the use of larger absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Tremant gravelly sandy loam that is noncalcareous in the upper 9 inches is in the Sandy Loam Upland, 7- to 10-inch p.z., range site, and the Tremant gravelly sandy loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site.

113—Tremant gravelly loams. These deep and well drained soils are on fan terraces. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Most of the areas used as cropland have slopes of less than 1 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 45 percent of the soil in this unit is Tremant gravelly loam that is calcareous throughout, and 35 percent is Tremant gravelly loam that is noncalcareous in the upper 9 inches and is calcareous below. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Tremant soils is light reddish brown, gravelly loam about 1 inch thick. The upper 8 inches of the subsoil is light reddish brown gravelly loam, and the lower 32 inches is light reddish brown gravelly clay loam. The substratum to a depth of 60 inches or more is light reddish brown gravelly sand.

Included in this unit are small areas of Antho, Carrizo, and Valencia soils on flood plains and Carrizo, Denure, Momoli, Chuckawalla, Gunsight, Mohall, Pinamt, and Rillito soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Tremant soils is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

In areas where the soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

In areas where the soils are noncalcareous in the upper 9 inches, they have moderate potential for producing forage and respond moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the soils in this unit are used for septic tank absorption fields, they have few limitations. In a few areas the substratum is somewhat finer in texture than is typical for the soils, and in other areas the substratum is weakly cemented. The reduced permeability in these areas may require the use of larger absorption fields.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Tremant gravelly loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site, and the Tremant gravelly loam that is noncalcareous in the upper 9 inches is in the Loamy Upland, 7- to 10-inch p.z., range site.

114—Tremant gravelly loams, low precipitation. These deep and well drained soils are on fan terraces. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

About 45 percent of the soil in this unit is Tremant gravelly loam that is noncalcareous in the upper 9 inches and is calcareous below, and 35 percent is Tremant gravelly loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Tremant soils is light reddish brown gravelly loam about 1 inch thick. The upper 8 inches of the subsoil is light reddish brown gravelly loam, and the lower 32 inches is light reddish brown gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light reddish brown gravelly sand. In some areas these soils are noncalcareous to a depth of 20 inches or more.

Included in this unit are small areas of Antho, Carrizo, and Valencia soils on flood plains and Carrizo, Denure, Chuckawalla, Gunsight, Mohall, Pinamt, and Rillito soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Tremant soils is moderately slow. Available water capacity is moderate. Effective

rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

In areas where the soils are calcareous throughout, they have low potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

In areas where the soils are noncalcareous in the upper 9 inches, they have moderate potential for producing forage and respond moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

This map unit is in capability subclass VIIs, nonirrigated. The Tremant gravelly loam that is noncalcareous in the upper 9 inches is in the Limy Fan, 2- to 7-inch p.z., range site, and the Tremant gravelly loam that is calcareous throughout is in the Loamy Upland, 2- to 7-inch p.z., range site.

115—Tremant-Antho complex, 1 to 5 percent slopes. This map unit is on fan terraces, stream terraces, and associated flood plains. Elevation is 1,200 to 1,900 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Tremant gravelly sandy loam on fan terraces and stream terraces and 35 percent Antho sandy loam on narrow flood plains. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils in drainageways and Denure, Mohall, Momoli, and Pinamt soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light reddish brown gravelly sandy loam about 1 inch thick. The upper 8 inches of the subsoil is light reddish brown gravelly sandy loam, and the lower 32 inches is light reddish brown, calcareous gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light reddish brown, calcareous gravelly sand. In some areas this soil is noncalcareous to a depth of 20 inches or more.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Antho soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is brown sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, calcareous sandy loam.

Permeability of the Antho soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, this soil is subject to rare periods of flooding.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

The soils in this unit have moderate potential for producing forage. They respond moderately well to rangeland management. Where the range is in good or excellent condition, the soils produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

A few areas of this unit are in lower positions that receive extra moisture from runoff. These areas are far more productive than is typical for the unit. In some areas of this unit, the soil is calcareous in the surface layer and is therefore less productive than it is in most other areas of the unit.

If the Tremant soil is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the Antho soil is used as sites for buildings or roads, the main limitation is the hazard of flooding. This soil is subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on this soil should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

If the Tremant soil is used for septic tank absorption fields, it has few limitations.

If the Antho soil is used for septic tank absorption fields, the main limitation is the hazard of flooding. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Sandy Loam Upland, 7- to 10-inch p.z., range site.

116—Tremant-Gunsight-Rillito complex, 1 to 5 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 30 percent Tremant gravelly loam, 20 percent Gunsight very gravelly sandy loam, and 20 percent Rillito gravelly loam. The Tremant soil is dominantly on the tops of terraces, and the Gunsight and Rillito soils are on side slopes. The components of this unit are so intricately intermingled that it was not practical to map them at the scale used.

Included in this unit are small areas of Cipriano, Pinamt, Mohall, and Contine soils on the tops of terraces. Also included are small areas of Antho, Carrizo, and Gilman soils on alluvial fans and Carrizo soils in drainageways. The included areas make up about 30 percent of the total acreage. The percentage varies from one area to another.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is very pale brown gravelly loam about 2 inches thick. The subsoil is light yellowish brown gravelly clay loam about 24 inches thick. The substratum to a depth of 60 inches or more is pale brown, calcareous very gravelly sandy clay loam, extremely cobbly sandy clay loam, and extremely gravelly sandy clay loam. In some areas a buried soil is below the substratum. In some areas the upper part of the soil is calcareous.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is pinkish white, weakly cemented to strongly cemented, calcareous very gravelly sandy loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Rillito soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish white, calcareous gravelly loam about 2 inches thick. The underlying material to a depth of 60 inches or more is very pale brown, calcareous gravelly loam and gravelly sandy loam.

Permeability of the Rillito soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The soil in this unit in the Apache Junction area is weakly cemented and brittle at a depth of less than 40 inches.

This unit is used as rangeland and wildlife habitat.

The Tremant soil has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In a few areas the Tremant soil is calcareous in the surface layer and is therefore less productive than it is in most other areas of the soil.

The Gunsight and Rillito soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils.

The included Antho, Carrizo, and Gilman soils on alluvial fans and in drainageways are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. The Tremant soil is in the Loamy Upland, 7- to 10-inch p.z., range site, and the Gunsight and Rillito soils are in the Limy Upland, 7- to 10-inch p.z., range site.

117—Tremant-Gunsight-Rillito complex, low precipitation, 1 to 5 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 30 percent Tremant gravelly loam, 20 percent Gunsight very gravelly sandy loam, and 20 percent Rillito gravelly loam. The Tremant soil is dominantly on the tops of terraces, and the Gunsight and Rillito soils are on side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Cipriano, Pinamt, Mohall, and Contine soils on the tops of terraces. Also included are small areas of Antho, Carrizo, and Gilman soils on alluvial fans and Carrizo soils in drainageways. The included areas make up about 30 percent of the total acreage. The percentage varies from one area to another.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is very pale brown gravelly loam about 2 inches thick. The subsoil is light yellowish brown gravelly clay loam about 24 inches thick. The substratum to a depth of 60 inches or more is pale brown, calcareous very gravelly sandy clay loam, extremely cobbly sandy clay loam, and extremely gravelly sandy clay loam. In some areas a buried soil is below the substratum. In some areas the upper part of the soil is calcareous.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Gunsight soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown, calcareous very gravelly sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is pinkish white, weakly cemented to strongly cemented, calcareous very gravelly sandy loam.

Permeability of the Gunsight soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Rillito soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish white, calcareous gravelly loam about 2 inches thick. The underlying material to a depth of 60 inches or more is very pale brown, calcareous gravelly loam and gravelly sandy loam.

Permeability of the Rillito soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Tremant soil has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. In a few areas the Tremant soil is calcareous in the surface layer and is therefore less productive than in most other areas.

The Gunsight and Rillito soils are among the least productive rangeland soils in the survey area. They respond very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of these soils.

The included Antho, Carrizo, and Gilman soils on alluvial fans and in drainageways are much more productive than the other soils in the unit. Management of the soils in this unit should therefore be concentrated on these included soils, because they produce nearly all the available forage.

This map unit is in capability subclass VIIs, nonirrigated. The Tremant soil is in the Loamy Upland, 2- to 7-inch p.z., range site, and the Gunsight and Rillito soils are in the Limy Upland, 2- to 7-inch p.z., range site.

118—Tremant-Rillito complex. This map unit is on fan terraces. Slope is 0 to 3 percent. Elevation is 1,300 to 2,000 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 45 percent Tremant gravelly sandy loam and 30 percent Rillito gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Carrizo soils in drainageways and Cipriano, Gunsight, Pinamt, and Momoli soils on fan terraces. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light reddish brown gravelly sandy loam about 1 inch thick. The upper 8 inches of the subsoil is light reddish brown gravelly sandy loam, and the lower 32 inches is light reddish brown, calcareous gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light reddish brown, calcareous gravelly sand. In some areas this soil is noncalcareous to a depth of 20 inches or more.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Rillito soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is pinkish gray and very pale brown, calcareous gravelly loam about 12 inches thick. The upper 24 inches of the underlying material is very pale brown, calcareous gravelly sandy loam, and the lower part to a depth of 60 inches or more is very pale brown, calcareous very gravelly sandy loam.

Permeability of the Rillito soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, as wildlife habitat, and for urban development.

The Tremant soil has moderate potential for producing forage. It responds moderately well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve

the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

The Rillito soil is one of the poorest forage-producing soils in the survey area. It responds very slowly to rangeland management. The high content of lime and the low available water capacity contribute to the low productivity of the soil.

If the Tremant soil is used as sites for buildings or roads, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content in the soil. Runoff should be diverted away from buildings. Landscaping plants that require little water should be used near building foundations, and overwatering should be avoided. A sealer can be used under roads to prevent shrinking and swelling of the material below.

If the Rillito soil is used as sites for buildings or roads, it has few limitations.

If the soils in this unit are used for septic tank absorption fields, they have few limitations.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. The Tremant soil is in the Sandy Loam Upland, 7- to 10-inch p.z., range site, and the Rillito soil is in the Limy Upland, 7- to 10-inch p.z., range site.

119—Tremant-Suncity complex, 1 to 8 percent slopes. This map unit is on fan terraces. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 2 to 7 inches, and the average annual air temperature is 70 to 73 degrees F.

This unit is about 40 percent Tremant gravelly loam and 30 percent Suncity very gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Gadsden soils on flood plains and Cipriano, Beardsley, Gunsight, Mohall, Sal, Pinamt, and Rillito soils on fan terraces. The included areas make up about 30 percent of the total acreage. The percentage varies from one area to another.

The Tremant soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow, calcareous gravelly loam about 1 inch thick. The upper 8 inches of the subsoil is light reddish brown, calcareous gravelly loam, and the lower 32 inches is light reddish brown, calcareous gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light reddish brown, calcareous gravelly sand. In some areas this soil is noncalcareous to a depth of 20 inches or more.

Permeability of the Tremant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Suncity soil is very shallow and shallow and is well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown very gravelly loam about 2 inches thick. The subsoil is reddish yellow clay loam about 10 inches thick. A silica- and lime-cemented hardpan is at a depth of 12 inches. In some areas the soil is calcareous throughout.

Permeability of the Suncity soil is slow. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The Tremant soil has low to moderate potential for producing forage. It responds slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year. In some areas this soil is noncalcareous in the surface layer and is therefore more productive than it is in most other areas.

The Suncity soil has low potential for producing forage. It responds slowly to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing.

A few small areas of this unit east of the Hassayampa River receive more precipitation than is typical for the unit. These areas are somewhat more productive than most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. The Tremant soil is in the Limy Fan, 2- to 7-inch p.z., range site, and the Suncity soil is in the Loamy Upland, 2- to 7-inch p.z., range site.

120—Tres Hermanos gravelly sandy loams. These deep and well drained soils are on fan terraces. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 8 to 10 inches, and the average annual air temperature is 66 to 70 degrees F.

About 65 percent of the soil in this unit is Tres Hermanos gravelly sandy loam that is noncalcareous in the surface layer but is calcareous below, and 15 percent is Tres Hermanos gravelly sandy loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Tres Hermanos soils is reddish yellow gravelly sandy loam about 2 inches thick. The upper 4 inches of the subsoil is reddish yellow clay loam, and the lower 16 inches is yellowish red gravelly and very gravelly clay loam. The substratum to a depth of 60 inches or more is very gravelly loam.

Included in this unit are small areas of Anthony soils on flood plains and Mohave, Greyeagle, Nickel, and Pinaleno soils on fan terraces. Also included are small areas of Arizo and Guest soils in drainageways. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

In areas where the soils are noncalcareous in the surface layer, they have moderate potential for producing forage and respond well to rangeland management. The soils can produce forage year round. They are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

In areas where the soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

A few small areas of this unit in the eastern part of the survey area receive more precipitation than is typical for the unit. These areas are somewhat more productive than most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. The Tres Hermanos gravelly sandy loam that is noncalcareous in the surface layer is in the Sandy Loam Upland, 8- to 10-inch p.z., range site, and the Tres Hermanos gravelly sandy loam that is calcareous throughout is in the Limy Fan, 8- to 10-inch p.z., range site.

121—Tres Hermanos-Anthony complex, 1 to 5 percent slopes. This map unit is on fan terraces, stream terraces, and associated flood plains. Elevation is 1,800 to 3,000 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

This unit is about 50 percent Tres Hermanos gravelly loam and 35 percent Anthony sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Arizo soils in drainageways and Pinaleno and Nickel soils on fan terraces and stream terraces. The included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Tres Hermanos soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is reddish yellow gravelly loam about 2 inches thick. The upper 4 inches of the subsoil is reddish yellow, calcareous clay loam, and the lower 16 inches is yellowish red, calcareous gravelly and very gravelly clay loam. The substratum to a depth of 60 inches or more is white, weakly lime-cemented or strongly lime-cemented very gravelly loam. In some areas this soil is noncalcareous to a depth of 10 inches or more.

Permeability of the Tres Hermanos soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Anthony soil is deep and well drained. It formed in alluvium derived dominantly from acid and basic igneous rock. Typically, the surface layer is light brown sandy loam about 2 inches thick. The upper 38 inches of the underlying material is light brown and brown, calcareous gravelly sandy loam, and the lower part to a depth of 60 inches or more is light reddish brown, calcareous loam. Some areas of this soil are noncalcareous to a depth of 10 inches or more.

Permeability of the Anthony soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, this soil is subject to rare periods of flooding.

This unit is used as rangeland and wildlife habitat.

The Tres Hermanos soil has moderate to high potential for producing forage. It responds well to rangeland management. This soil can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

The Anthony soil is one of the most productive rangeland soils in the survey area. It receives extra moisture from runoff, which increases production. The soil responds well to rangeland management. Extra care in management is needed to protect the soil from gullying and channeling. This soil can produce forage year round, and it is easily traversed by cattle. Because of the availability of water, ease of access, and abundance of feed, some areas of this soil are overgrazed.

In areas of this unit that have been invaded by woody species, the productivity of the soils can be improved by prescribed burning or by chemical or mechanical treatment of the brush. Other types of land uses should be considered in selecting a method of brush control.

The riparian habitat in some areas of this unit is extremely important to wildlife.

A few small areas of this unit in the northeastern part of the survey area receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

This map unit is in capability subclass VIIs, nonirrigated. The Tres Hermanos soil is in the Sandy Loam Upland, 10- to 12-inch p.z., range site, and the Anthony soil is in the Sandy Bottom, 10- to 12-inch p.z., range site.

122—Vado gravelly sandy loam, 1 to 5 percent slopes. This deep and well drained soil is on fan terraces. It formed in alluvium derived dominantly from acid and basic igneous rock. Elevation is 1,800 to 2,500 feet. The average annual precipitation is 10 to 12 inches, and the average annual air temperature is 66 to 70 degrees F.

Typically, the surface layer is yellowish brown gravelly sandy loam about 2 inches thick. The subsoil is brown very gravelly sandy loam about 26 inches thick. The substratum to a depth of 60 inches or more is brown and strong brown, calcareous very gravelly sandy loam.

Included in this unit are small areas of Anthony and Arizo soils in drainageways and Pinaleno and Tres Hermanos soils on fan terraces. The included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Vado soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development.

The soil in this unit has high potential for producing forage. It responds well to rangeland management. The soil can produce forage year round. It is easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

If the soil in this unit is used as sites for buildings, roads, or septic tank absorption fields, it has few limitations.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Sandy Loam Upland, 10- to 12-inch p.z., range site.

123—Vaiva very gravelly loam, 1 to 20 percent slopes. This very shallow and shallow, well drained soil is on hill slopes. It formed in alluvium and colluvium derived dominantly from granite and gneiss. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the surface layer is brown very gravelly loam about 1 inch thick. The upper 2 inches of the subsoil is yellowish red very gravelly loam, and the lower 8 inches is red very gravelly sandy clay loam. Below the subsoil to a depth of 17 inches is red, highly fractured granite overlying unweathered granite.

Included in this unit are small areas of Brios and Carrizo soils in drainageways; Antho soils on low benches adjacent to drainageways; Chuckawalla, Ebon, Gunsight, Pinamt, and Cipriano soils on the tops of terraces; and Quilotosa soils and Rock outcrop on hill slopes. The included areas make up about 40 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Vaiva soil is moderate. Available water capacity is very low. Effective rooting depth is less than 20 inches. Runoff is medium, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. A few areas are used for urban development.

The soil in this unit has low potential for producing forage, but it produces a good variety of perennial species. It responds slowly to rangeland management. It can produce forage year round. Because areas of this unit are commonly the only relatively flat areas in and around the steeper areas they are associated with, cattle tend to overuse these areas before moving to the steeper areas. Placing watering facilities properly and fencing areas of this unit with steeper areas encourage livestock to graze the steeper slopes.

A few small areas of this unit southeast of the Belmont Mountains receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

If the soil in this unit is used as sites for buildings or roads, the main limitations are depth to rock and steepness of slope. The cuts needed to provide nearly level building sites or roadbeds can expose bedrock that is difficult to excavate. Ripping or blasting, or both, may be necessary to remove bedrock to the desired depth. The very shallow and shallow depth to bedrock also interferes with excavation for installing utilities. In the steeper areas, extensive cutting and filling may be required to create a level building pad. Fill areas should be compacted to the same density as cut areas. Cuts and fills are highly susceptible to erosion. The risk of

erosion can be reduced by using diversions or terraces to reduce the length of slopes or by revegetating to slow runoff.

If the soil in this unit is used for septic tank absorption fields, the main limitations are the depth to rock and steepness of slope. Septic tank absorption fields may not operate properly in some areas of this unit. The limited depth to bedrock restricts the movement of effluent. Effluent is likely to flow through cracks in the rock, resulting in little filtration. Effluent may saturate the soil to the surface in the nearly level areas of this unit, and it may seep to the surface downslope in the steeper areas. Alternatives include locating absorption fields in more suitable soils in adjacent areas and transporting the effluent to them by pipeline or installing community sewage systems.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Shallow Upland, 7- to 10-inch p.z., range site.

124—Valencia sandy loams. These deep and well drained soils are on alluvial fans. They formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 1,900 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

About 40 percent of this unit is Valencia sandy loam that is noncalcareous in the upper 1 inch and is calcareous below, and 40 percent is Valencia sandy loam that is calcareous throughout. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the surface layer of these Valencia soils is light brown sandy loam about 1 inch thick. The next layer is light brown sandy loam 19 inches thick. Below this is a buried subsoil of light reddish brown, calcareous sandy clay loam and reddish yellow, calcareous gravelly sandy clay loam and clay loam 40 inches thick or more. Depth to the buried subsoil ranges from 20 to 39 inches.

Included in this unit are small areas of Antho, Estrella, and Gilman soils near drainageways and Denure and Tremant soils on fan terraces. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of these Valencia soils is moderately rapid in the upper 20 inches and moderately slow below. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. Where unprotected, these soils are subject to rare periods of flooding.

This unit is used as rangeland, as wildlife habitat, and for urban development.

In areas where these soils are calcareous throughout, they have moderate potential for producing forage and respond slowly to rangeland management. Most of the vegetation is produced following rainfall in winter and spring. In favorable winters, the production of annual grasses and forbs can support grazing for about 2 to 3 months. Little forage is available during the rest of the year.

In areas where these soils are noncalcareous in the upper 1 inch, they have moderate potential for producing forage and respond well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. These soils are easily traversed by livestock. Resting pastures during alternate growing seasons helps to maintain or improve the vegetation. Fencing and developing watering facilities help to control grazing. To control erosion, extra care must be taken to maintain a good plant cover.

If the soils in this unit are used as sites for buildings or roads, the main limitation is the hazard of flooding. The soils are subject to localized flooding from overland flow, particularly during high intensity thunderstorms of short duration. Foundations built on these soils should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

If the soils in this unit are used for septic tank absorption fields, the main limitations are the hazard of flooding and the moderately slow permeability of the buried subsoil. In areas that are subject to flooding, sewerlines should be connected to a community sewage system to minimize the possibility of contaminating ground water and creating a hazard to health. The limitation of moderately slow permeability can be minimized by increasing the size of the absorption field and by backfilling excavations with gravelly or sandy material.

Onsite investigation is needed to determine the most suitable alternatives and the best design of buildings, roads, and septic tank absorption fields.

This map unit is in capability subclass VIIc, nonirrigated. The Valencia sandy loam that is noncalcareous in the upper 1 inch is in the Sandy Loam Upland, 7- to 10-inch p.z., range site, and the Valencia sandy loam that is calcareous throughout is in the Limy Fan, 7- to 10-inch p.z., range site.

125—Vint loamy fine sand. This deep and well drained soil is on flood plains. It formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 1,600 feet. The average annual precipitation is 7 to 10 inches, and the average annual air temperature is 70 to 73 degrees F.

Typically, the soil is light brown, calcareous loamy fine sand to a depth of 60 inches or more.

Included in this unit are small areas of Antho, Brios, Carrizo, Gilman, and Maripo soils on flood plains. The included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Vint soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is high. Where unprotected, this soil is subject to rare periods of flooding.

This unit is used as rangeland, as wildlife habitat, and for urban development.

The soil in this unit has high potential for producing forage. It responds well to rangeland management. Where the range is in good or excellent condition, it produces forage year round. The soil is easily traversed by livestock. Fencing and developing watering facilities help to control grazing. Extra care is needed to maintain the plant cover, because the soil is very susceptible to wind erosion.

A few small areas of this unit adjacent to the Hassayampa River and Jackrabbit Wash receive less precipitation than is typical for the unit. These areas are somewhat less productive than most other areas of the unit.

This unit is poorly suited to use as sites for buildings, roads, and septic tank absorption fields because of the hazard of flooding.

This map unit is in capability subclass VIIs, nonirrigated. It is in the Sandy Upland, 7- to 10-inch p.z., range site.

Prime Farmland

In this section, prime farmland is defined and discussed and the prime farmland soils in the Aguila-Carefree Area are listed.

Prime farmland is of major importance in providing the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. Adequate moisture and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils either are used for producing food or fiber or are available for these uses. Urban or built-up land and water areas cannot be considered prime farmland.

Prime farmland soils commonly get an adequate and dependable supply of moisture from precipitation or irrigation and have a low or better than low available water capacity. Temperature and growing season are favorable, and the level of acidity on alkalinity is acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. They are not affected by salts or alkali. The slope ranges mainly from 0 to 6 percent.

Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland soils if the limitations are overcome by drainage, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information on the criteria for prime farmland soils can be obtained at the local office of the Soil Conservation Service.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

About 33,000 acres, or nearly 2 percent of the survey area, meets the requirements for prime farmland. The major areas are in the Salt River Pima-Maricopa Indian Community and the Aguila area. Almost all prime farmland soils are in map units 4 and 9 on the general soil map.

The following map units meet the soil requirements for prime farmland. On all soils included in the list, irrigation is used to compensate for insufficient precipitation. The location of each map unit is shown on the detailed soil maps at the back of this publication. Soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

5 Anthony sandy loam
22 Contine clay loam
23 Contine clay
24 Continental clay loam, 0 to 3 percent slopes
25 Continental clay, 0 to 3 percent slopes
54 Gila fine sandy loams
55 Gilman loams
57 Gilman clay loam
60 Glenbar loams
67 Guest clay
75 Mohall loam
77 Mohall clay loam
78 Mohall clay loam, calcareous solum
79 Mohall clay
82 Mohave sandy loam
83 Mohave loam
84 Mohave loam, calcareous solum
85 Mohave clay loam
86 Mohave clay loam, calcareous solum
101 Rillito loam, 0 to 3 percent slopes
112 Tremant gravelly sandy loams
113 Tremant gravelly loams

The following map units would meet the requirements for prime farmland if water were made available for irrigation.

1 Antho sandy loams
2 Antho gravelly sandy loams
27 Continental-Mohave complex, 1 to 7 percent slopes
53 Gadsden clay

56 Gilman loams, low precipitation
76 Mohall loam, calcareous solum
87 Mohave complex
88 Mohave-Guest complex
114 Tremant gravelly loams, low precipitation
118 Tremant-Rillito complex
120 Tres Hermanos gravelly sandy loams
124 Valencia sandy loams

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 avoid soil-related failures in land uses.

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation 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 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.

Irrigated Cropland

Dennis Kimberlin, soil conservationist, Soil Conservation Service, helped to prepare this section.

General management needed for irrigated crops and pasture is suggested in this section. The major crops grown in the area are identified, the system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops are listed for each soil.

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

About 34,000 acres of land in the survey area is used for irrigated farming. The main crops are cotton, wheat, barley, grain sorghum, alfalfa hay, and safflower. Proper use and management of the irrigated soils of the area requires use of effective cropping systems, addition of organic material, installation of improved irrigation systems, improved water management, and minimum tillage.

An effective cropping system is one that includes a combination of practices that maintain crop growth and that improve the fertility and tilth of the soil. Such a system includes crop rotation supported by green-manure crops, crop residue, fertilization, land leaching, minimum tillage, and other suitable practices.

Most of the soils in the survey area have a low content of organic matter, commonly less than 1 percent, because the high temperatures in the area promote rapid oxidation. Crop production cannot be sustained unless organic material is incorporated into the soil.

The addition of organic material to the soil improves soil tilth and increases fertility, aeration, and permeability. Disking or plowing crop residue into the soil speeds decomposition and releases humic acids, which improve soil structure, root development, and water movement. The organic matter content can also be improved by adding cotton gin trash, manure, or other similar material. Addition of organic material greatly aids in the reduction of soil compaction.

Adding very large amounts of manure, over 30 tons per acre, can cause salt to build up in the soil. Applying increased amounts of nitrogen may be necessary to speed the breakdown of residue that is high in cellulose. Increased amounts of nitrogen are also needed for crop production, because nitrogen is tied up during decomposition of the crop residue.

Arizona's most limited resource is water, and agricultural interests must compete with expanding urban, industrial, and mining interests for a share of the available water. Therefore, it is imperative that the use of irrigation water becomes more efficient. An efficient

irrigation system is designed according to the soil, slope, crop, and special needs of the land and is properly managed.

Irrigation management is probably the most important tool available to farmers. It consists of regulating the application of irrigation water in such a way that high crop production is obtained without wasting water or eroding the soil. Numerous factors must be considered: the amount of water the soil can retain, the depth to which plant roots penetrate, and the requirements of the crop. Most crops should be irrigated when 40 to 50 percent of the available moisture in the root zone has been depleted. A soil probe or auger can be used to check the moisture content of the root zone.

Most irrigated soils are deep, have an adequate available water capacity, and have slopes of less than 1 percent. These soils are suited to basin irrigation. They can be managed efficiently and produce higher than normal yields of crops (fig. 9).

Two types of irrigation systems are used in the survey area. A graded irrigation system, used on sloping soils, has limited efficiency because it produces tailwater. A basin system, used in level areas, is more efficient because runoff is eliminated.

A graded system may be more economical than a basin system in areas where the soils are too steep and the earthmoving requirements too great to level a field, unfavorable soil substrata may be exposed by deep leveling cuts, or water is relatively inexpensive. The efficiency of a graded irrigation system can be improved by using a tailwater recovery system.

Basin irrigation is more efficient than graded irrigation, particularly in areas where the soils have a slow water intake rate. Leveling fields may be necessary for a basin system to function properly.

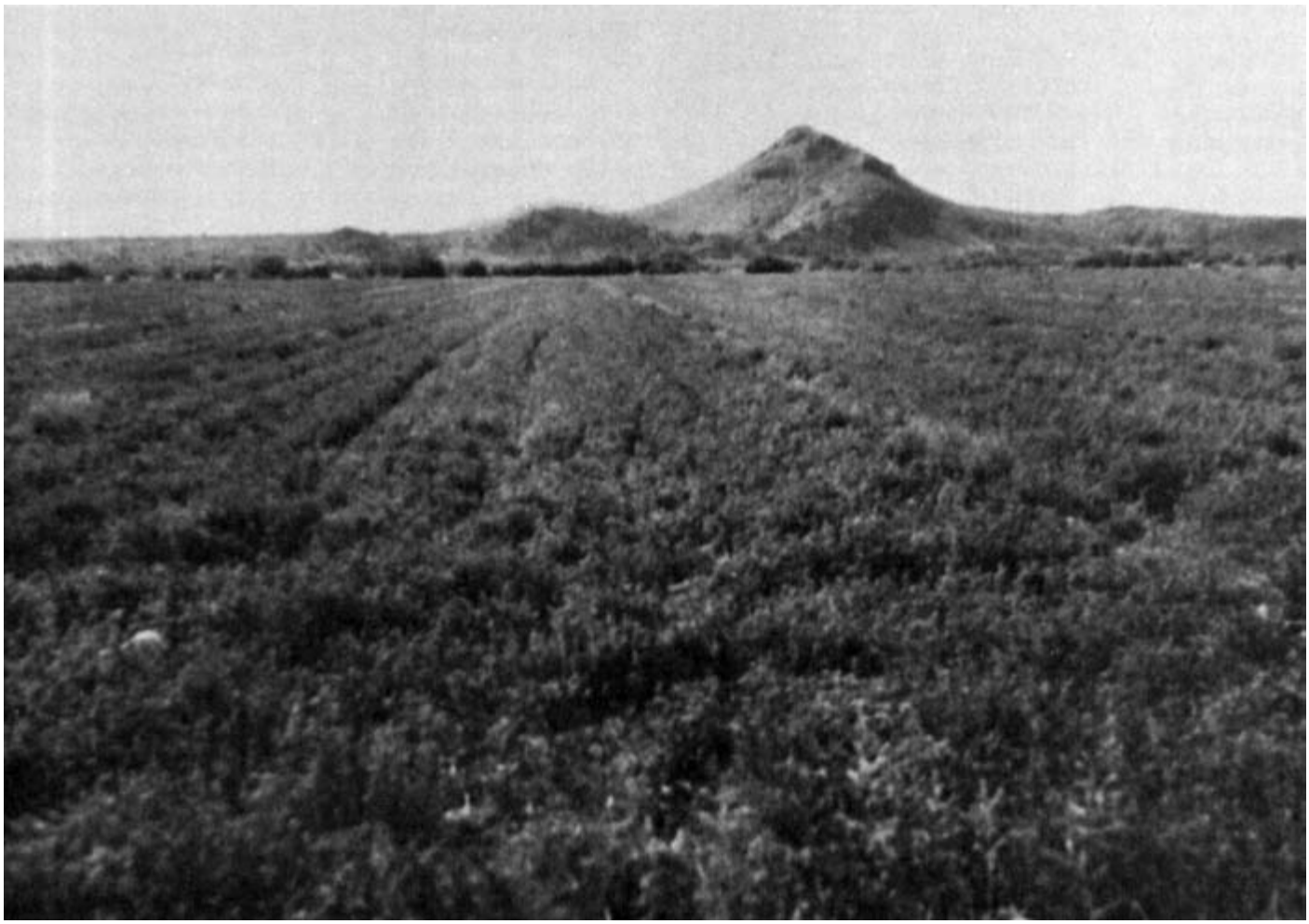

Figure 9.—Alfalfa on Continental clay near Aguila.

Leveling fields can create problems if cuts expose substrata that have unfavorable properties such as concentrations of lime or layers of sand or gravel. The detailed map units describe soils that may be underlain by such strata. Rillito loams, for example, have concentrations of lime at a depth of about 20 to 40 inches. The information, however, is limited. Estimates and other data, for example, generally apply only to that part of the soil within a depth of 5 feet. Also, because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil. This information is not site specific and does not eliminate the need for onsite investigation before irrigation systems are planned and leveling cuts are made.

Irrigation water generally is applied by the border, furrow, or corrugation method. Sprinklers are used to a lesser degree, generally for germination of vegetable seeds and on crops grown on coarser textured soils. Drip irrigation is used in a few orchards.

If water is applied too rapidly to a fine-textured soil, such as Contine clay, it runs off. If water is applied too slowly on a coarse-textured soil, such as Anthony sandy loam, it penetrates below the root zone and is wasted. A properly designed irrigation system is tailored to the soil. Water can be conserved by using pipelines and cement-lined ditches and by reusing or eliminating irrigation tailwater. General suggestions are given in the description of each map unit. More specific suggestions are available in the local office of the Soil Conservation Service.

Water quality is another important consideration in irrigation water management. The quality of water used for irrigation in the survey area varies widely. Continual irrigation can eventually increase the content of salts or sodium, or both, in the soil to toxic levels unless the soil is deeply leached occasionally. Leaching is particularly critical if the irrigation water is of poor quality, because the amount of salts and sodium added to the soil is proportionately higher. The amount of leaching necessary varies with the soil and the type and quantity of salts in the water. Water analysis tests are available to determine the quality of the irrigation water.

Application of fertilizer generally is required to obtain and maintain profitable yields. Tests on plant tissue or the soil can be used to determine the optimum amount of fertilizer needed for maximum crop yields. In general, legumes respond to high phosphorus fertilizer and other crops respond to nitrogen and phosphorus fertilizer.

Soils that have high concentrations of lime at or near the surface, such as Rillito loam, should receive split applications of phosphorus because it is readily tied up in the soil. Lime-induced chlorosis is a problem in these areas in citrus crops and sorghum. Frequently the cause of chlorosis is a lack of available iron. Like phosphorus, iron is readily tied up by high concentrations of lime.

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 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The 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 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, and trace elements for each crop; effective use of crop residue, manure, and green-manure crops; and harvesting that insures the smallest possible loss.

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

Crops other than those shown in table 5 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 Soil 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 grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider 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 use as rangeland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (*9*). Only

class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman 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 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 limitation is 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; *s* shows that the soil is limited mainly because it is shallow, droughty, stony, or clayey; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 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.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland

Steve Cassady, range conservationist, Soil Conservation Service, helped to prepare this section.

Most of the survey area is used as rangeland because, in general, the area has a low elevation and a hot, dry climate. The survey area includes parts of two Major Land Resource Areas (MLRA's): the Sonoran Basin and Range, D30; and the Central Arizona Basin and Range, D40 (A subresource area and precipitation zone map precedes the general soil map in the back of this survey). These two MLRA's are subdivided into subresource areas, for example, D30-1 and D40-2. Delineations are based on general differences in climate, physiography, soils, vegetation, land use, water resources, and conservation problems.

The Lower Sonoran Desert Shrub, D30-1, is the only subresource area of MLRA D30 in the survey area. It includes the Hassayampa Plain in the southwestern part of the survey area, which is the hottest and driest part of the survey area. The mean annual precipitation ranges from 2 to 7 inches. Most of the rainfall occurs in winter, and summer rains are erratic. The vegetation is dominantly scattered trees, shrubs, cacti, and annual grasses. In wet years, annuals provide much of the available forage on these sites. Most of the vegetation occurs in small drainageways that receive runoff from adjacent uplands. Characteristic plants of Subresource Area D30-1 are creosotebush, big gallets, white bursage, littleleaf paloverde, and ironwood.

MLRA D40 is subdivided into three subresource areas: the Upper sonoran Desert shrub, D40-1; the Phoenix Desert shrub, D40-2; and the Central Arizona Desert Grassland Shrub, D40-3. All three of these subresource areas are included in the survey area. The most extensive subresource area in the survey area is D40-2. It is in the western, central, and southeastern parts of the survey area. It is almost as warm as D30-1, but D40-2 receives considerably more rainfall. The mean annual precipitation is 7 to 10 inches, and summer rainfall is more consistent. The vegetation is dominantly shrubs, but perennial grasses comprise a significant part of the vegetation. In wet years, annuals are important as forage. Most of the vegetation grows in small drainageways that receive runoff from adjacent uplands. Characteristic plants of Subresource Area D40-2 are creosotebush, triangle bursage, littleleaf paloverde, ironwood, bush muhly, and threeawn.

Subresource areas D40-1 and D40-3 are at a higher elevation than D30-1 and D40-2. They are cooler and generally are slightly moister. The vegetation density is higher in D40-1 and D40-3, and grasses comprise more of the vegetation. In upland areas of D40-1 and D40-3, the density of vegetation increases even more. The characteristic vegetation in the drainageways in D30-1 and D40-2 is the same as that in upland positions in D40-1 and D40-3.

Subresource Area D40-1 includes the north-central and northeastern parts of the survey area. It forms an arc from the Hieroglyphic Mountains east through New River and Carefree to the Fort McDowell Mohave-Apache Indian Community. The mean annual precipitation is 10 to 12 inches, but a few small areas receive as much as 16 inches. Much of the rainfall occurs in summer. Range sites in this subresource area are dominated by trees and shrubs and an understory of perennial grasses. Characteristic plants of Subresource Area D40-1 are littleleaf paloverde, triangle bursage,

jojoba, grama, bush muhly, Arizona cottontop, and threeawn.

Subresource Area D40-3 is in the northwestern part of the survey area, in the Wickenburg and Aguila areas. This area is similar to D40-1 in vegetation, temperature, and precipitation, but in D40-3 most of the precipitation occurs in winter. There are two precipitation zones in D40-3. In most of the area, the mean annual precipitation is 8 to 10 inches. The upper slopes of the Harquahala Mountains, however, receive 10 to 12 inches of rain annually. The vegetation in D40-3 is dominantly trees, shrubs, and perennial grasses. Characteristic plants of Subresource Area D40-3 are creosotebush, white bursage, big galleta, bush muhly, flattop buckwheat, littleleaf paloverde, and desert needlegrass. A small area near the crest of the Harquahala Mountains has somewhat cooler temperatures and more precipitation than is typical. In this area, turbinella oak and sideoats grama are common.

Because the amount of grazeable forage is so closely related to how much rain falls, similar map units are differentiated according to the different precipitation zones. In the southern part of the survey area, map units in the 2- to 7-inch precipitation zone are correlated "low precipitation" units. In the northern part, the "low precipitation" units are either in the 8- to 10-inch precipitation zone or in the 7- to 10-inch precipitation zone. If fewer than 2,000 acres of any unit was mapped in a given precipitation zone, the map unit is treated as an inclusion and no separate map unit is recognized.

If moisture is available, most of the perennial species grow throughout the year because winters are warm. Grasses such as tobosa, big galleta, bush muhly, and threeawn may have several growth periods a year. In general, these grasses produce new leaves, roots, and seeds in spring after winter precipitation and again late in summer after summer precipitation.

Because winter precipitation is relatively dependable, winter and spring are the periods of peak forage production. In addition to perennial species, numerous annual forbs and grasses provide forage. These annuals help to relieve the grazing pressure on the perennial species. Some of the more important perennial forage plants of the survey area are big galleta, bush muhly, tobosa, threeawn, slim tridens, flattop buckwheat, white bursage, white ratany, Mormon-tea, and false-mesquite. Littleleaf paloverde and ironwood, though not considered excellent browse plants, provide an abundance of feed and at times are heavily grazed.

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 6 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in table 6 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties, such as landscape position and the presence of calcium carbonate, that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil texture, the content of coarse fragments, depth to a hardpan or to bedrock, and slope are also important.

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. In this survey, the annual yield of air-dry vegetation is rated *slow* if it is less than 300 pounds per acre, *moderate* if it is 300 to 600 pounds per acre, and *high* if it is more than 600 pounds per acre.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is 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. It does not have a specific meaning that pertains to the present plant community in a given use.

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, reduction 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.

If the condition of an area of range deteriorates, palatable plants decrease and less palatable "invaders" increase. Common invaders in upland and hill areas include creosotebush, triangle bursage, broom snakeweed, and several species of cactus. In bottom areas, mesquite and desert broom are common invaders.

In this survey area, management should be concentrated on improving or using the more productive sites, such as bottoms and some upland and hill areas. These areas have the most potential and give the greatest return in proportion to the investment made. In much of the survey area, the more productive bottom areas make up only a small percentage of the area but provide nearly all the forage for livestock and habitat for wildlife. Care should be taken to protect these sites from erosion. Runoff from adjacent or upstream areas is important in increasing the production of forage, and management should include conservation of moisture.

Many of the range areas in the mountains produce more or better vegetation, or both, than the surrounding upland range sites; however, they may be used less because of the steepness of slope, stones, and unavailability of water. In these mountainous areas, livestock trails may help improve use. Bottom areas are often overgrazed because they are the most accessible. They have a longer green period and receive extra water. Fencing and water development are important management practices that improve the distribution of livestock (fig. 10).

Seeding to improve range condition generally is not a suitable practice in most of the survey area. Sufficient moisture to establish new plants may not be available. The condition of the range can be improved more readily by the use of management practices such as deferred grazing, fencing, water development, and brush management.

Recreation

Recreation in the survey area is increasing rapidly as the populations of Phoenix and the surrounding cities grow. Recreation areas are used predominantly for boating, fishing, picnicking, camping, and sightseeing.

There are three regional parks within the survey area: Lake Pleasant, Fort McDowell, and Usery Mountain. Lake Pleasant is used for boating, fishing, swimming, picnicking, and camping (fig. 11). Fort McDowell and Usery Mountain are commonly used for picnicking and sightseeing. Parts of the Verde and Salt Rivers are popular spots for swimming, fishing, and other water sports. The Cave Creek, Carefree, and Pinnacle Peak areas are popular sightseeing attractions.

In the Wickenburg area, there are several dude ranches that feature horseback riding and other western activities. Some winter visitors camp on public lands, pan for gold, and collect rocks.

The soils of the survey area are rated in table 7 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 sewerlines. 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 recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, 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 7 can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in table 9 and interpretations for septic tank absorption fields in table 10.

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 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

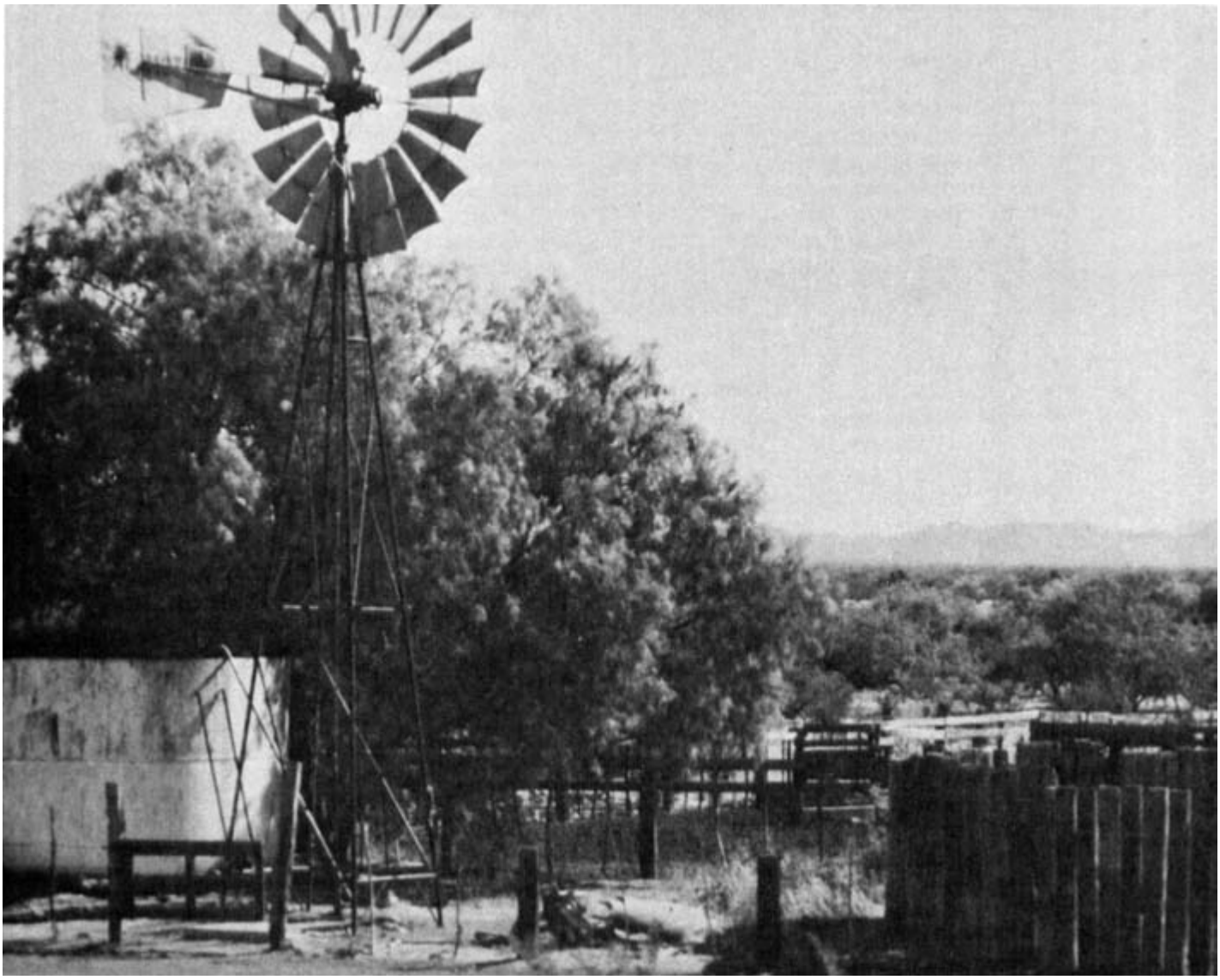

Figure 10.—Shallow wells in and along drainageways are the source of water for livestock and wildlife.

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 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

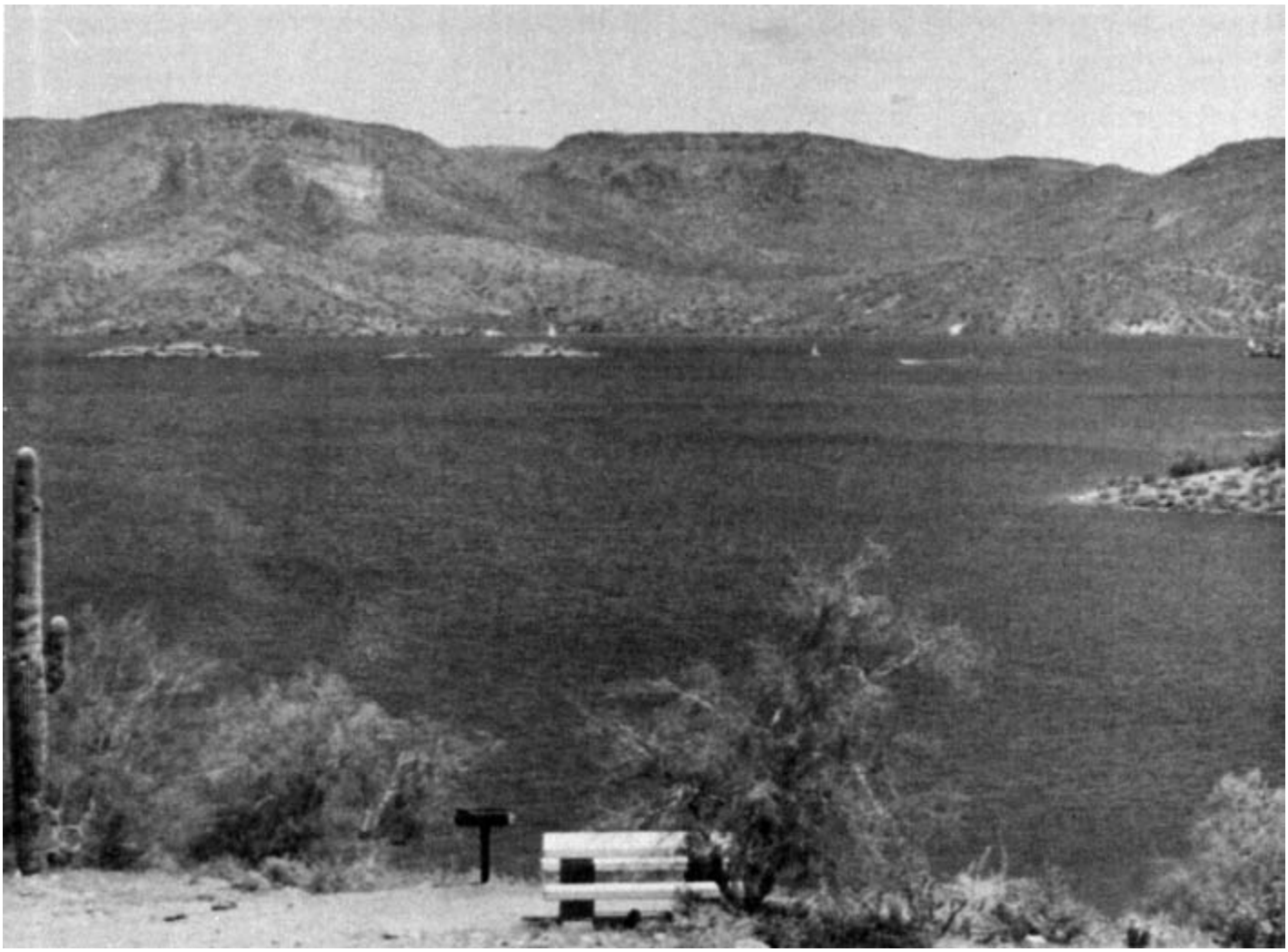

Figure 11.—Lake Pleasant, one of several lakes in the Phoenix area that provides recreation facilities and water for irrigation and for industrial and domestic uses.

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

Angela S. Morris, soil conservationist, Soil Conservation Service, helped to prepare this section.

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

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or

maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for t he designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, and sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are lovegrass, bermudagrass, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bush muhly, fiddleneck, spurges, and buckwheat.

Hardwood trees produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are ironwood, paloverde, and mesquite.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are creosotebush, triangle bursage, white bursage, and jojoba.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, rushes, and sedges.

The habitat for various kinds of wildlife in the soil survey area can be classified into four general types: openland, woodland, wetland, and rangeland. There are several distinct vegetative associations, each with characteristic wildlife communities, within the woodland and rangeland types of habitat.

Habitat for openland wildlife consists of cropland and areas that are overgrown with grasses, herbs, and shrubs. The agricultural lands in the survey area are a part of this habitat. Where different habitats merge, there is a great diversity of vegetation and may be a greater diversity of wildlife species. This is called an "edge effect." An edge effect may be created in areas where cultivated areas are interspersed with natural desert areas. Cropland in these areas can provide a seasonal source of food and water for wildlife. In large, intensively used areas, however, the kinds of wildlife are reduced and only a few species such as blackbirds, house sparrows, and starlings remain.

Wildlife typically present in areas of openland habitat include; mourning dove, white-winged dove, Inca dove, striped skunk, desert cottontail, and Colorado River toad.

Habitat for woodland wildlife consists of land primarily used for growing trees or for watershed protection, beautification, or wildlife purposes. The potential of soils in this survey area to provide woodland habitat is not rated. This habitat type generally is associated with the included soils in the map units and is scattered throughout the poorer upland habitats. These areas commonly provide a nucleus habitat, and the uplands provide only contributory habitat.

The following paragraphs describe the vegetation associations and list the typical and special interest species attracted to these areas. "Special interest" is a Federal or State designation for unique, rare, sensitive, threatened, or endangered animal and plant species.

Within the survey area, the following vegetation associations can be classified as woodland habitat.

The mixed riparian scrub habitat is along washes and in canyons. The typical vegetation is composed of one or a combination of the following: desert willow, mesquite, catclaw, blue paloverde, and ironwood. These areas provide feeding, nesting, and shade areas for wildlife. They are particularly important if they are surrounded by areas that do not have one or more of these habitat components. Wildlife species in these areas generally are the same as the species in the surrounding habitat but are more numerous.

The mesquite-saltcedar riparian vegetation association is primarily along rivers in the survey area (fig. 12). This vegetation replaces the more desirable cottonwood-willow riparian vegetation if flood damage, excessive grazing pressure, or lowering of the water table occurs. This habitat does support a wide variety of songbirds as well as to provide important nesting habitat for white-

winged doves in some areas. Typical species in this habitat include Lucy's warbler, phainopepla, screech owl, gray fox, bobcat, and mule deer. The Bell's vireo and yellow-billed cuckoo are birds of special interest that use these areas.

The cottonwood-willow vegetation association is along the upper reaches of rivers in the survey area. Water is present for much of the year, or the water table is near the surface. The cottonwood-willow association is probably the most valuable wildlife habitat in the survey area. Although it does not comprise a large percentage of the total area, this habitat type provides the vital moisture and shade that are lacking in the surrounding desert areas. Many wildlife species common to other habitats are more numerous in these areas; some species are restricted to this habitat only. The greatest diversity of songbirds in the survey area is in this vegetation association. Some typical wildlife species include raccoon, gray fox, striped skunk, heron, belted kingfisher, northern oriole, and cardinal. Species of special interest in this habitat include bald eagle, black hawk, zone-tailed hawk, yellow-billed cuckoo, and Gilbert's skink.

Habitat for wetland wildlife consists of marshy or swampy, shallow water areas where water-tolerant plants grow. Wetlands in the survey area are limited in size and distribution and are primarily of an ephemeral nature. These areas are created, for the most part, by widely fluctuating water levels in manmade reservoirs such as Lake Pleasant. Wildlife such as ducks, geese, herons, and shore birds are attracted to these areas.

Habitat for rangeland wildlife consists of areas of wild herbaceous plants and shrubs and exists in areas where various factors such as low rainfall and topography preclude growing commercial crops. Within the survey area, there are three vegetation associations that are recognized as rangeland habitat.

Figure 12.—An area of Brios-Carrizo complex, low precipitation, 1 to 5 percent slopes, under mesquite-saltcedar riparian vegetation.

The creosotebush-white bursage association is at an elevation of 1,000 to 3,000 feet in valleys. This association comprises a large part of the survey area. There is little difference in the height of vegetation in this habitat, and there are fewer wildlife species than in other habitats. Distribution of vegetation over a variety of height classes creates more niches for wildlife and the opportunity for a greater diversity of wildlife. Typical species in this habitat include the black-throated sparrow, desert iguana, sidewinder, and Merriam's kangaroo rat. Species of special interest in this habitat include the kit fox and burrowing owl.

The saguaro-paloverde association is at an elevation of 1,200 to 4,400 feet, on foothills and in valleys. Understory plants include triangle bursage, flattop buckwheat, and brittlebush on hillsides and white bursage, ironwood, and various species of cactus in valleys. This habitat is important to a variety of birds; many use the saguaro as a nesting structure or for nesting cavities. Wildlife typical of this community include Gambel's quail, mourning dove, mule deer, javelina, coyote, and black-tailed jackrabbit. Species of special interest in this habitat include desert tortoise, Gila monster, and Harris' hawk.

Areas of open chaparral within the survey area are limited in size and distribution. There is an area of chaparral, approximately 5,500 acres in size, in the Harquahala Mountains. Part of this area is within the boundaries of this survey. The vegetation of this area is comprised primarily of turbinella oak, mountainmahogany, ceanothus, and quininebush. This area is isolated from similar areas by miles of desert. The wildlife of this area includes animals such as mule deer, coyote, bobcat, ringtail, scrub jay, poorwill, and bushtit. Because of its geographic location and distance from similar areas, this area represents a wildlife habitat of special interest and value.

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. The ratings are given in the following tables: 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 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 need to 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 feet of the surface, slope, likelihood of flooding, and natural soil structure aggregation. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind 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 (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan irrigation systems, ponds, and other structures for soil and water conservation; and (8) 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 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings 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 about 5 feet for 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 resistance of the excavation walls or banks to sloughing or caving is affected by soil texture.

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, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. Flooding and shrink-swell potential can cause the movement of footings. Depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than about 5 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, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil) and shrink-swell potential 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, depth to bedrock or to a cemented pan, and the available water capacity in the upper 40 inches affect plant growth. Flooding, slope, stoniness, and the amount of sand and clay in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect 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 10 also shows the suitability of the soils for use as daily cover for landfills. 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, 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.

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 10 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, depth to bedrock or to a cemented pan, flooding, and large stones.

Excessive seepage because of rapid permeability of the soil causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. 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 needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, slope, and flooding affect both types of landfill. Texture, stones and boulders, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 5 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 type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, 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 or a cemented pan 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.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 feet.

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

The ratings are for the soil material below the surface layer to a depth of 5 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 1 5 to 25 percent, or many stones. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as grus, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts and respond well to fertilizer.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, or have slopes of more than 15 percent.

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

Water Management

Table 12 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 and for 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 irrigation and terraces and diversions.

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 or salts or sodium. It also affects trafficability.

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 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 reduce erosion and conserve moisture by intercepting runoff. Slope, 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 water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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 (*10*). During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps.

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 characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, 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 13 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 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 "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 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 (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

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

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

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

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil (*6*). 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 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 14 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.

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 "Soil Series and Their Morphology."

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, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

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, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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 some 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 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 change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 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, very fine sand, sand, and organic matter (up to 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. 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 water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils 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, 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 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 by runoff from adjacent slopes. Water standing for short periods after rainfall is not considered flooding, nor is water in swamps and marshes.

Table 15 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, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

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 absence of distinctive horizons that form in soils that are not subject to flooding.

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.

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 specified as 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.

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause 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 creates a severe corrosion environment. 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 (*12*). 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 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten 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 (*Argi*, modified from argillic horizon, 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; 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 Haplargids (*Hapl*, meaning minimal horizonation, plus *argid*, the suborder of the Aridisols that have an argillic horizon).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic 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 known kind of soil. 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. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, hyperthermic Typic Haplargids.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

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* (*8*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*12*). Unless otherwise stated, 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."

Antho Series

The Antho series consists of deep, well drained soils on flood plains, on alluvial fans, and in drainageways. These soils formed in alluvium derived from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 2,100 feet. The average annual precipitation is about 2 to 10 inches, the mean annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents.

Typical pedon of an Antho sandy loam, in an area of Tremant-Antho complex, 1 to 5 percent slopes, about

1,620 feet east and 50 feet north of the southwest corner of sec. 27, T. 4 N., R. 3 E.

A1—0 to 3 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; few very fine tubular pores; 10 percent fine pebbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

C1—3 to 60 inches; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few fine and very fine tubular pores; 10 percent fine pebbles; slightly effervescent; moderately alkaline.

A buried B2t horizon commonly is below the control section. The profile is 5 to 30 percent gravel throughout.

The A horizon has value of 5 to 7 when dry and 3 or 4 when moist, and it has chroma of 2 or 4. It is sandy loam or gravelly sandy loam. It is noneffervescent to slightly effervescent.

The C horizon has value of 5 to 7 when dry and 3 to 5 when moist, and it has chroma of 2 or 4. It is sandy loam, gravelly sandy loam, fine sandy loam, or gravelly fine sandy loam and averages less than 18 percent clay. In some areas the C horizon has strata of coarser or finer textured soil material that are 1/2 to 1 inch thick. Effervescence ranges from slight to strong.

Anthony Series

The Anthony series consists of deep, well drained soils on flood plains and alluvial fans. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 5 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are coarse-loamy, mixed (calcareous), thermic Typic Torrifluvents.

Typical pedon of Anthony sandy loam, about 1,150 feet east and 200 feet south of the northwest corner of sec. 1, T. 6 N., R. 9 W.

A1—0 to 2 inches; light brown (7.5YR 6/4) sandy loam, brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine roots; many very fine tubular pores; 5 percent fine pebbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

C1—2 to 25 inches; brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and common fine roots; common very fine tubular and interstitial pores; 15 percent fine pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

C2—25 to 40 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine roots; few fine tubular pores and common very fine interstitial pores; 25 percent fine pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

IIBtcab—40 to 60 inches; light reddish brown (5YR 6/4) loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; few fine tubular pores and common very fine interstitial pores; 5 percent fine pebbles; few very fine lime filaments and masses; strongly effervescent; moderately alkaline.

A buried argillic horizon is below a depth of 40 inches in some pedons. The profile is 5 to 30 percent coarse fragments throughout.

The A horizon has dominant hue of 7.5YR or 10YR, but it ranges to 5YR. The horizon has value of 5 to 7 when dry and 3 or 4 when moist, and it has chroma of 2 to 4. It is noneffervescent to slightly effervescent.

The C horizon has dominant hue of 7.5YR or 10YR, but it ranges to 5YR. The horizon has value of 5 to 7 when dry and 3 or 4 when moist, and it has chroma of 2 to 4. It is sandy loam, gravelly sandy loam, fine sandy loam, or gravelly fine sandy loam. Thin strata of coarser or finer textured material are in the control section. The C horizon is slightly effervescent to strongly effervescent.

Arizo Series

The Arizo series consists of deep, excessively drained soils on flood plains. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are sandy-skeletal, mixed, thermic Typic Torriorthents.

Typical pedon of an Arizo gravelly sandy loam, in an area of Anthony-Arizo complex, 0 to 3 percent slopes, about 2,600 feet north and 1,950 feet east of the southwest corner of sec. 18, T. 4 N., R. 5 E.

A1—0 to 1 inch; pink (7.5YR 7/4) gravelly sandy loam, brown (7.5YR 5/4) moist; weak thin platy structure; slightly hard, friable, nonsticky and slightly plastic; few fine and very fine roots; few fine and very fine tubular and vesicular pores; 20 percent pebbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

C1—1 inch to 8 inches; light brown (7.5YR 6/4) very gravelly sandy loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, friable, nonsticky and nonplastic; few medium, fine, and very fine roots; few fine and very fine tubular pores; 35 percent pebbles; noneffervescent; moderately alkaline; clear smooth boundary.

C2—8 to 25 inches; reddish yellow (7.5YR 8/6) very gravelly loamy sand, reddish yellow (7.5YR 6/6) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; common fine and very fine interstitial pores; 40 percent pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

C3—25 to 60 inches; pink (7.5YR 7/4) very gravelly loamy sand, reddish yellow (7.5YR 6/6) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; common fine and very fine interstitial pores; 45 percent pebbles; violently effervescent; moderately alkaline.

The profile is mildly alkaline or moderately alkaline and is noneffervescent to strongly effervescent. The control section is more than 35 percent coarse fragments, of which as much as 20 percent is cobbles and as much as 5 percent is stones. Some pedons contain thin strata of finer or coarser textured soil material in the control section.

The A and C horizons have hue of 10YR or 7.5YR, value of 5 to 8 when dry and 4 to 6 when moist, and chroma of 2 to 6. The A horizon is gravelly sandy loam or cobbly sandy loam. The C horizon is gravelly sand, very gravelly sand, very gravelly loamy sand, very gravelly sandy loam, or very cobbly loamy sand.

Beardsley Series

The Beardsley series consists of moderately deep, well drained soils on fan terraces and stream terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine, mixed, hyperthermic Typic Durargids.

Typical pedon of a Beardsley cobbly clay loam, in an area of Carefree-Beardsley complex, about 1,000 feet east and 800 feet south of the northwest corner of sec. 14, T. 5 N., R. 3 E.

A1—0 to 2 inches; reddish brown (5YR 5/3) cobbly clay loam, reddish brown (5YR 4/3) moist; moderate medium platy structure; slightly hard, friable, sticky and plastic; many very fine roots; many very fine tubular pores; 20 percent cobbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

B21t—2 to 24 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/4) moist; weak coarse prismatic structure parting to strong medium angular blocky; very hard, friable, very sticky and very plastic; many very fine roots; many fine tubular pores; few thin clay films on faces of peds and lining pores; many pressure faces; strongly effervescent; moderately alkaline; abrupt wavy boundary.

B22t—24 to 36 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; very hard, friable, very sticky and very plastic; few very fine roots; common very fine interstitial pores; few thin clay films lining pores; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Csicam—36 inches; white (5YR 8/1) and pinkish white (5YR 8/2), indurated, silica- and lime-cemented duripan that has a thin laminar layer on the upper surface; massive; extremely hard; violently effervescent.

Depth to the duripan ranges from 20 to 40 inches, but it is dominantly 30 to 36 inches. Thickness of the duripan ranges from 4 to 24 inches. In some pedons the duripan is fractured.

The A1 horizon has hue of 7.5YR or 5YR, value or 4 or 5 when dry and 3 or 4 when moist, and chroma of 3 or 4. The horizon is 15 to 40 percent cobbles and 10 to 20 percent gravel. Effervescence ranges from slight to strong.

The B2t horizon has hue of 5YR or 7.5YR, value of 4 to 6 when dry and 4 or 5 when moist, and chroma of 3 or 4. It is dominantly clay, but the range includes heavy clay loam. The content of coarse fragments is less than 15 percent.

Beeline Series

The Beeline series consists of very shallow and shallow, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from strongly cemented sandy conglomerate. Slope is 3 to 45 percent. Elevation is 1,200 to 1,700 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy, mixed (calcareous), hyperthermic, shallow Typic Torriorthents.

Typical pedon of a Beeline very gravelly sandy loam, in an area of Beeline-Cipriano complex, 3 to 45 percent slopes, about 1,200 feet west and 100 feet north of the southeast corner of sec. 20, T. 4 N., R. 7 E.

About 40 percent of the surface is covered with fine pebbles.

A1—0 to 1 inch; light reddish brown (5YR 6/3) very gravelly sandy loam, reddish brown (5YR 5/3) moist; weak thin platy structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; common very fine tubular pores; 5 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.
C1—1 inch to 7 inches ; light reddish brown (5YR 6/4) sandy loam, reddish brown (5YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots and few medium roots; common very fine tubular pores; 5 percent pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.
C2—7 to 9 inches; pink (5YR 7/3) sandy loam, reddish brown (5YR 5/3) moist; massive; hard, firm, nonsticky and nonplastic; few very fine, fine, and medium roots; few very fine tubular pores and common very fine interstitial pores; 5 percent pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.
Cr—9 to 60 inches; pink (5YR 7/3), strongly cemented, sandy conglomerate; common lime coatings in joints.

Depth to the Cr horizon is 5 to 20 inches.

The control section averages less than 35 percent coarse fragments and less than 25 percent clay. The profile is mildly alkaline or moderately alkaline.

The A1 horizon has hue of 7.5YR or 5YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 2 or 3 when dry or moist.

The C horizon has hue of 7.5YR or 5YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 2 or 3 when dry or moist. It is gravelly loam, gravelly sandy loam, very fine sandy loam, sandy clay loam, or sandy loam.

The Cr horizon has hue of 7.5YR or 5YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 3 or 4 when dry or moist. It is sandy loam to coarse sand and is as much as 15 percent fine pebbles. The matrix is dominantly noneffervescent. Lime seams are along cracks in some pedons.

Brios Series

The Brios series consists of deep, somewhat excessively drained soils on flood plains and in drainageways. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 5 percent. Elevation is 1,000 to 2,100 feet. The average annual precipitation is 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are sandy, mixed, hyperthermic Typic Torrifluvents.

Typical pedon of a Brios loamy sand, in an area of Brios-Carrizo complex, low precipitation, 1 to 5 percent slopes, about 1,650 feet east and 500 feet north of the southwest corner of sec. 30, T. 4 N., R. 4 W.

A1—0 to 2 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; weak medium platy structure; slightly hard, very friable; many very fine roots; many very fine tubular pores; moderately alkaline; noneffervescent; abrupt smooth boundary.
C1—2 to 21 inches; pinkish gray (7.5YR 6/2) sand, brown (7.5YR 5/2) moist; massive; slightly hard, very friable; many very fine and few medium roots; common very fine interstitial pores; 5 percent pebbles; moderately alkaline; noneffervescent; clear smooth boundary.
C2—21 to 32 inches; pale brown (10YR 6/3) gravelly coarse sand, brown (10YR 4/3) moist; single grain; loose; few very fine and medium roots; few very fine interstitial pores; 15 percent pebbles; moderately alkaline; slightly effervescent; clear smooth boundary.
C3—32 to 60 inches; pale brown (10YR 6/3) coarse sand and strata of fine sandy loam and sandy loam that are 1/4 inch to 2 inches thick, brown (10YR 4/3) moist; massive; hard, very friable; few very fine and medium roots; few very fine interstitial pores; 5 percent pebbles; moderately alkaline; strongly effervescent.

The content of coarse fragments in the control section is less than 35 percent.

The A horizon has hue of 10YR, value of 5 or 6 when dry, and chroma of 3 or 4 when dry or moist. It is noneffervescent or slightly effervescent.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 2 to 4 when dry or moist. It is coarse sand, gravelly coarse sand, sand, or loamy sand. It is noneffervescent to strongly effervescent in the upper part and is slightly effervescent to violently effervescent in the lower part.

Carefree Series

The Carefree series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 8 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine, mixed, hyperthermic Vertic Haplargids.

Typical pedon of Carefree cobbly clay loam, 1 to 8 percent slopes, 2,560 feet north and 1,530 feet east of the southwest corner of sec. 14, T. 5 N., R. 2 W.

A1—0 to 1 inch; pink (7.5YR 7/4) cobbly clay loam, brown (7.5YR 4/4) moist; weak thin platy structure;

slightly hard, friable, sticky and plastic; many fine and very fine roots; few very fine vesicular pores and common fine tubular pores; 25 percent cobbles and 10 percent pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

B21t—1 inch to 17 inches; light reddish brown (5YR 6/4) clay, reddish brown (5YR 5/4) moist; weak medium prismatic structure parting to weak medium subangular blocky; hard, firm, sticky and plastic; common fine and very fine roots; many fine and very fine interstitial pores and few fine tubular pores; common moderately thick clay films lining pores and on faces of peds; 5 percent pebbles; few fine lime veins; strongly effervescent; moderately alkaline; clear wavy boundary.

B22t—17 to 50 inches; light reddish brown (5YR 6/4) clay, reddish brown (5YR 4/4) moist; strong coarse prismatic structure parting to strong fine and medium angular blocky; many cracks as much as 1 inch wide; very hard, firm, very sticky and very plastic; common fine and very fine roots; few fine tubular pores and common coarse, medium, fine, and very fine interstitial pores; many thick clay films lining pores and on faces of peds; 3 percent pebbles; few fine and very fine white lime veins; strongly effervescent; abrupt wavy boundary.

IIB2tca—50 to 60 inches; light brown (7.5YR 6/4) extremely cobbly clay, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; extremely hard, friable, sticky and plastic; few fine roots; many fine and very fine interstitial pores; common thin clay films on faces of peds; 50 percent cobbles and 25 percent pebbles; many large soft lime masses and few lime veins; violently effervescent; moderately alkaline.

In some pedons a hardpan is at a depth of 40 inches or more. The profile is slightly effervescent to violently effervescent throughout. In some pedons a calcic horizon is at a depth of 30 inches or more.

The A horizon has hue of 10YR to 5YR, but it is dominantly 7.5YR. The horizon has value of 4 to 7 when dry or moist, and it has chroma of 3 to 5 when dry or moist. The content of coarse fragments ranges from 0 to 50 percent.

The B horizon has hue of 7.5YR or 5YR, value of 4 to 7 when dry or moist, and chroma of 3 to 6 when dry or moist. It is dominantly clay, but the range includes silty clay and heavy clay loam. The content of coarse fragments ranges from 0 to 15 percent.

Carrizo Series

The Carrizo series consists of deep, excessively drained soils on flood plains, in drainageways, and on alluvial fans, fan terraces, and stream terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 5 percent. Elevation is 1,000 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are sandy-skeletal, mixed, hyperthermic Typic Torriorthents.

Typical pedon of a Carrizo very gravelly sand, in an area of Antho-Carrizo-Maripo complex, about 1,200 feet south and 1,600 feet west of the northeast corner of sec. 30, T. 3 N., R. 7 E.

A1—0 to 1 inch; pinkish gray (7.5YR 6/2) very gravelly sand, brown (7.5YR 4/2) moist; weak thin platy structure; slightly hard, friable; many very fine roots; many very fine tubular pores; 35 percent pebbles; slightly effervescent; moderately alkaline; abrupt wavy boundary.

C1—1 inch to 28 inches; pinkish gray (7.5YR 6/2) very gravelly sand, dark brown (7.5YR 4/4) moist; massive; loose, very friable; many very fine roots; common very fine interstitial pores; 40 percent pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

C2—28 to 60 inches; pinkish gray (7.5YR 6/2) very gravelly coarse sand, brown (7.5YR 4/2) moist; single grain; loose; common very fine roots; common very fine interstitial pores; 45 percent pebbles; slightly effervescent; moderately alkaline.

The profile is mildly alkaline or moderately alkaline throughout and is noneffervescent to strongly effervescent. Strata of finer textured soil material that are 1/2 inch to 2 inches thick are common in the control section.

The A and C horizons have hue of 10YR or 7.5YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 2 to 4 when moist. The A horizon is gravelly or very gravelly sand or sandy loam. The C horizon is very gravelly sand, very gravelly coarse sand, extremely gravelly coarse sand, loamy sand, or sand.

Cave Series

The Cave series consists of shallow and very shallow, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 30 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy, mixed, thermic, shallow Typic Paleorthids.

Typical pedon of a Cave gravelly loam, in an area of Nickel-Cave complex, 8 to 30 percent slopes, about 1,600 feet north and 1,500 feet west of the southeast corner of sec. 19, T. 7 N., R. 6 W.

A1—0 to 1 inch; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 4/4) moist; moderate thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores and few very fine interstitial pores; 30 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—1 inch to 14 inches; pinkish gray (7.5YR 7/2) loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; common fine interstitial pores; 10 percent pebbles; violently effervescent; moderately alkaline; abrupt smooth boundary.

C2cam—14 to 20 inches; pinkish white (7.5YR 8/2), indurated, lime-cemented hardpan, pinkish gray (7.5YR 6/2) moist; massive; extremely hard, extremely firm; violently effervescent; strongly alkaline; abrupt smooth boundary.

C3ca—20 to 60 inches; pinkish white (7.5YR 8/2) very gravelly sandy loam, pink (7.5YR 8/4) moist; massive; hard, firm, nonsticky and nonplastic; common medium roots; few very fine interstitial pores; 45 percent pebbles; violently effervescent; strongly alkaline.

Depth to the petrocalcic horizon ranges from 8 to 19 inches. About 5 to 30 percent of the surface is covered with coarse fragments. The control section is 10 to 30 percent coarse fragments. The Ccam horizon is 6 to 20 inches thick, but in some pedons layers of Ccam material 4 to 8 inches thick are separated by calcareous soil material.

The A horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 3 or 4.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 8 when moist, and chroma of 2 to 4. It is loam, gravelly sandy loam, very gravelly sandy loam, or gravelly loam.

Cellar Series

The Cellar series consists of very shallow and shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from granite and gneiss. Slope is 10 to 70 percent. Elevation is 2,000 to 5,400 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 65 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy-skeletal, mixed, nonacid, thermic Lithic Torriorthents.

Typical pedon of a Cellar very gravelly fine sandy loam, in an area of Cellar-Rock outcrop complex, low precipitation, 10 to 70 percent slopes, about 800 feet west of the northeast corner of sec. 15, T. 5 N., R. 10 W.

A1—0 to 2 inches; brown (7.5YR 5/4) very gravelly fine sandy loam, dark brown (7.5YR 5/4) moist; weak very thin platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine vesicular pores; 50 percent pebbles; noneffervescent; mildly alkaline; clear smooth boundary.

C1—2 to 3 inches; strong brown (7.5YR 5/6) very gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; many thin yellowish red (5YR 5/8) clay films on rock fragments; 45 percent pebbles; noneffervescent; mildly alkaline; clear irregular boundary.

Cr—3 to 12 inches; partially weathered granite; soil material in joints; many thin yellowish red (5YR 5/8) clay films coating granite; diffuse wavy boundary.

R—12 inches; unweathered granite.

Depth to bedrock ranges from 2 to 14 inches. The content of rock fragments is more than 35 percent throughout. The A horizon has hue of 7.5YR or 10YR, value of 3 to 5 when moist, and chroma of 4 or 6. The Cr horizon is dominantly noneffervescent, but it ranges to violently effervescent.

Cherioni Series

The Cherioni series consists of very shallow and shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from basalt. Slope is 5 to 60 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic, shallow Typic Durorthids.

Typical pedon of Cherioni extremely stony loam, in an area of Cherioni-Rock outcrop complex, 5 to 60 percent slopes, about 2,640 feet east and 900 feet north of the southwest corner of sec. 26, T. 3 N., R. 6 W.

About 70 percent of the surface is covered with stones, and 30 percent is covered with pebbles, cobbles, and pan fragments.

A1—0 to 1 inch; light yellowish brown (10YR 6/4) extremely stony loam, dark yellowish brown (10YR 4/4) moist; weak very thin platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine vesicular pores; 70 percent lime-coated pebbles, cobbles, stones, and pan fragments; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—1 inch to 10 inches; reddish yellow (7.5YR 6/4) extremely gravelly loam, strong brown (7.5YR 5/6) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine vesicular pores; 70 percent lime-coated pebbles, cobbles, and pan fragments; violently effervescent; moderately alkaline; clear wavy boundary.

C2sicam—10 to 13 inches; light brown (7.5YR 6/4) silica- and lime-cemented duripan; 1/2-inch-thick laminar layer on surface; abrupt smooth boundary.

R—13 inches; unweathered basalt; lime coatings on surface.

About 50 to 90 percent of the surface is covered with stones and boulders, and 10 to 60 percent is covered with pebbles, cobbles, and pan fragments. Depth to the duripan ranges from 2 to 20 inches. The control section ranges from 40 to 70 percent rock fragments.

The A horizon has hue of 10YR or 7.5YR, and it has value of 6 to 8 when dry and 3 to 5 when moist. It is strongly effervescent or violently effervescent.

The Cca horizon has hue of 10YR or 7.5YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 4 or 6 when dry or moist.

Chuckawalla Series

The Chuckawalla series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 5 percent. Elevation is 1,100 to 1,600 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic Typic Haplargids.

Typical pedon of a Chuckawalla extremely gravelly loam, in an area of Chuckawalla-Gunsight complex, low precipitation, 1 to 8 percent slopes, about 1,100 feet west and 400 feet north of the southeast corner of sec. 16, T. 2 N., R. 4 W.

About 90 percent of the surface is covered with varnished desert pavement.

A2—0 to 2 inches; light brown (7.5YR 6/4) extremely gravelly loam, dark brown (7.5YR 4/4) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine vesicular pores; 12 percent pebbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

B1t—2 to 6 inches; light brown (7.5YR 6/4) very gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; moderate very fine and fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial pores; 39 percent pebbles; strongly effervescent; 6 percent calcium carbonate equivalent; strongly alkaline; clear smooth boundary.

B2tsa—6 to 14 inches; yellowish red (5YR 5/6) extremely gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak very fine granular structure; slightly hard, very friable, sticky and plastic; few very fine roots; common very fine interstitial pores; few thin clay films bridging and staining mineral grains; 67 percent pebbles; strongly effervescent; 17 percent calcium carbonate equivalent; moderately alkaline; strongly saline; gradual wavy boundary.

Cca—14 to 60 inches; white (5YR 8/1) extremely gravelly sandy loam, pinkish white (5YR 8/2) moist; massive; weakly cemented; very hard, firm, nonsticky and nonplastic; 60 percent pebbles, 5 percent cobbles, and 5 percent stones; violently effervescent; 23 percent calcium carbonate equivalent; moderately alkaline.

About 85 to 95 percent of the surface is covered with a desert pavement of pebbles and a thin layer of desert varnish.

The A horizon has value of 6 or 7 when dry and 4 or 5 when moist, and it has chroma of 4 or 6.

The B2tsa horizon is clay loam or sandy clay loam and is 35 to 70 percent gravel. It has hue of 5YR or 7.5YR, value of 5 or 6 when dry, and chroma of 4 to 8. The electrical conductivity of a saturated extract from the B2tsa horizon ranges from 4 to 27 millimhos per centimeter at 25 degrees C. The conductivity generally is highest in the lower part of the argillic horizon.

A B2tca or Cca horizon is at a depth of 6 to 40 inches in most pedons. It is more than 15 percent calcium carbonate equivalent in most pedons.

Cipriano Series

The Cipriano series consists of very shallow and shallow, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 25 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic shallow Typic Durorthids.

Typical pedon of Cipriano very gravelly loam, about 2,000 feet south and 200 feet east of the northwest corner of sec. 27, T. 5 N., R. 1 E.

A1—0 to 1 inch; light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores and common fine vesicular

pores; 45 percent pebbles, cobbles, and pan fragments; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—1 inch to 6 inches; light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; few fine tubular pores and common very fine interstitial pores; 40 percent pebbles and pan fragments; strongly effervescent; moderately alkaline; clear smooth boundary.

C2sicam—6 to 10 inches; light brown (7.5YR 6/4) and pinkish gray (7.5YR 6/2), indurated, silica- and lime-cemented duripan; laminar layer on surface; extremely hard; violently effervescent.

Depth to the indurated duripan ranges from 4 to 20 inches, but it is dominantly 4 to 12 inches. The content of coarse fragments is 35 to 80 percent in the control section.

The A1 horizon has hue of 10YR or 7.5YR, value of 4 to 7 when dry or moist, and chroma of 3 or 4 when dry or moist.

The Cca horizon has hue of 7.5YR and 10YR, value of 4 to 8 when dry or moist, and chroma of 2 to 4 when dry or moist. It is dominantly very gravelly loam or very gravelly sandy loam, but it is very gravelly loamy sand in some pedons.

Contine Series

The Contine series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 8 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine, mixed, hyperthermic Typic Haplargids.

Typical pedon of Contine clay loam, about 500 feet north and 200 feet west of the southeast corner of sec. 18, T. 4 N., R. 7 E.

A1—0 to 2 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium platy structure; hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; few moderately thick clay films lining pores; 5 percent fine pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

B21t—2 to 8 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; common very fine tubular pores; common moderately thick clay films on faces of peds and lining pores; 5 percent fine pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

B22tca—8 to 30 inches; reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine and few coarse roots; common very fine tubular and interstitial pores; common moderately thick clay films on faces of peds and lining pores; many medium pinkish white (7.5YR 8/2) soft lime masses; strongly effervescent; moderately alkaline; clear wavy boundary.

Cca—30 to 60 inches; light reddish brown (5YR 6/4) sandy loam, reddish brown (5YR 4/4) moist; hard, firm, nonsticky and slightly plastic; few fine roots; few fine tubular pores; violently effervescent; moderately alkaline.

The content of coarse fragments in the control section ranges from 0 to 35 percent, but it is dominantly less than 15 percent. The content of calcium carbonate in the lower part of the B horizon is more than 15 percent in some pedons. The profile is slightly effervescent to strongly effervescent.

The A horizon has hue of 5YR or 7.5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 4 or 6 when dry or moist. It is clay or clay loam. It is noneffervescent to strongly effervescent.

The B horizon has hue of 5YR or 7.5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 4 or 6 when dry or moist. It is dominantly clay, but it includes heavy clay loam or sandy clay. It is noneffervescent to strongly effervescent in the upper part and is strongly effervescent or violently effervescent in the lower part.

The C horizon is loam, sandy loam, or clay loam. In some pedons it is weakly cemented.

Continental Series

The Continental series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 8 percent. Elevation is 1,800 to 3,300 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 180 to 240 days.

These soils are fine, mixed, thermic Typic Haplargids.

Typical pedon of a Continental clay loam, in an area of Continental-Mohave complex, 1 to 4 percent slopes, about 2,550 feet north and 1,500 feet west of the southeast corner of sec. 36, T. 7 N., R. 9 W.

A1—0 to 1 inch; light brown (7.5YR 6/4) clay loam, dark reddish brown (5YR 3/4) moist; weak medium platy structure; slightly hard, friable, sticky and plastic; many very fine and common fine roots; common

very fine tubular pores; noneffervescent; moderately alkaline; clear smooth boundary.

B21t—1 inch to 8 inches; brown (7.5YR 4/4) clay, reddish brown (5YR 4/4) moist; weak and moderate medium subangular blocky structure; slightly hard, firm, very sticky and very plastic; many very fine and common fine roots; common fine tubular pores; thin clay films in root channels; slightly effervescent; moderately alkaline; clear wavy boundary.

B22t—8 to 23 inches; reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/3) moist; strong medium prismatic structure parting to strong medium angular blocky; very hard, very firm, very sticky and very plastic; many very fine and fine roots; common fine tubular pores; few thin clay films in pores and on faces of peds; strongly effervescent; moderately alkaline; clear wavy boundary.

B23tca—23 to 33 inches; reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/3) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; few thin clay films in pores and on faces of peds; common very fine and fine soft lime masses; violently effervescent; moderately alkaline; abrupt wavy boundary.

B24tca—33 to 60 inches; light reddish brown (5YR 6/4) clay, reddish brown (5YR 4/4) moist; moderate medium angular and subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; few thin clay films lining pores and on faces of peds; many large oval soft lime masses; violently effervescent; strongly alkaline.

The content of coarse fragments in the control section ranges from 0 to 35 percent, but it generally is less than 15 percent. The content of calcium carbonate in the B horizon is more than 15 percent in some pedons. In most pedons the profile is calcareous in the upper part of the solum, but some pedons are noncalcareous throughout.

The A horizon has hue of 5YR or 7.5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 4 or 6. It is clay loam, clay, cobbly clay loam, or loam.

The B horizon has hue of 5YR or 7.5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 4 or 6. It is clay, heavy clay loam, or sandy clay.

A C horizon is present in some pedons. It is loam, sandy loam, or clay loam. In some pedons it is weakly cemented.

Denure Series

The Denure series consists of deep, well drained soils on stream terraces and fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is about 250 to 300 days.

These soils are coarse-loamy, mixed, hyperthermic Typic Camborthids.

Typical pedon of a Denure gravelly sandy loam, in an area of Gilman-Momoli-Denure complex, about 750 feet south and 1,350 feet east of the northwest corner of sec. 33, T. 5 N., R. 2 W.

A1—0 to 1 inch; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/3) moist; moderate very fine, fine, and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine and fine interstitial pores; 30 percent pebbles; noneffervescent; mildly alkaline; clear smooth boundary.

B2—1 inch to 12 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; moderate medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine and fine interstitial and tubular pores; 20 percent pebbles; noneffervescent; mildly alkaline; abrupt wavy boundary.

C—12 to 60 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; moderate medium and coarse subangular blocky structure and massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial and tubular pores; 20 percent pebbles; strongly effervescent; moderately alkaline.

The control section averages 5 to 35 percent gravel. Some pedons are slightly effervescent or strongly effervescent throughout. Lime is disseminated, or it is as few filaments or thin coatings on pebbles. A buried calcic or argillic horizon is present in some pedons at a depth of more than 40 inches.

The A horizon is fine sandy loam or gravelly sandy loam and is 5 to 50 percent gravel. It is mildly alkaline or moderately alkaline. The B and C horizons are fine sandy loam, sandy loam, or gravelly sandy loam.

Dixaleta Series

The Dixaleta series consists of very shallow and shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from schist. Slope is 5 to 65 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy-skeletal, mixed (calcareous), thermic, shallow Typic Torriorthents.

Typical pedon of a Dixaleta extremely channery sandy loam, in an area of Dixaleta-Rock outcrop complex, 25 to 65 percent slopes, about 650 feet south and 400 feet west of the northeast corner of sec. 14, T. 6 N., R. 2 W.

A1—0 to 1 inch; yellowish brown (10YR 5/4) extremely channery sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 70 percent channery fragments; noneffervescent; mildly alkaline; clear wavy boundary.

B2—1 inch to 8 inches; yellowish brown (10YR 5/4) extremely channery sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine interstitial pores; 80 percent channery fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

IICrca—8 to 27 inches; variegated, highly fractured and partially weathered schist; few very fine roots; lime coatings along bedding planes and fractures; abrupt wavy boundary.

IIR—27 inches; schist; common thin coatings of lime in fractures.

Depth to highly fractured and partially weathered schist is 3 to 11 inches. Depth to unweathered bedrock is dominantly 20 to 60 inches, but it is more than 60 inches in some pedons. The content of rock fragments is 40 to 80 percent throughout.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 4. It is mildly alkaline or moderately alkaline and is noneffervescent to violently effervescent.

The B2 horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 to 6. It is very channery sandy loam, extremely channery sandy loam, extremely channery loam, very channery clay loam, or extremely channery clay loam. The B2 horizon is moderately alkaline or strongly alkaline and is strongly effervescent or violently effervescent.

Eba Series

The Eba series consists of deep, well drained soils on fan terraces and stream terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 40 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are clayey-skeletal, mixed, thermic Typic Haplargids.

Typical pedon of Eba very gravelly loam, 1 to 8 percent slopes, about 1,000 feet north and 300 feet east of the southwest corner of sec. 22, T. 6 N., R. 4 E.

About 50 to 60 percent of the surface is covered with cobbles and pebbles.

A1—0 to 3 inches; pink (7.5YR 6/4) very gravelly loam, brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine interstitial pores and common fine and very fine tubular pores; 35 percent rounded pebbles; noneffervescent; moderately alkaline; clear smooth boundary.

B21t—3 to 11 inches; reddish yellow (5YR 7/6) extremely gravelly clay, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, friable, very sticky and very plastic; many fine and very fine roots and few medium roots; common fine and very fine tubular and interstitial pores; common thin clay films on faces of peds and lining pores; 70 percent rounded pebbles and 5 percent cobbles; noneffervescent; moderately alkaline; clear smooth boundary.

B22t—11 to 19 inches; reddish yellow (5YR 7/6) very gravelly clay, yellowish red (5YR 4/6) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, very sticky and very plastic; common fine and very fine roots and few medium roots; common fine and very fine tubular and interstitial pores; common moderately thick clay films on faces of peds and lining pores; 80 percent rounded pebbles; many lime filaments and coatings on pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

B23t ca—19 to 36 inches; reddish yellow (5YR 7/6) extremely gravelly clay, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; hard, friable, very sticky and very plastic; common fine and very fine roots; common fine and very fine tubular and interstitial pores; common moderately thick clay films on faces of peds and lining pores; 80 percent rounded pebbles; many lime filaments and coatings on pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

IIC1ca—36 to 60 inches; reddish yellow (7.5YR 7/6) extremely gravelly sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common fine and very fine roots; common fine and very fine tubular pores; 75 percent rounded pebbles; many lime filaments and coatings on pebbles; violently effervescent; moderately alkaline.

The A horizon has hue of 10YR to 5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 2 to 6 when dry or moist.

The B horizon has hue of 7.5YR to 2.5YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 4

to 6 when dry or moist. It is clay or sandy clay and is 35 to 85 percent coarse fragments.

The Cca horizon is loamy sand or sandy loam and is 20 to 85 percent gravel. The horizon is weakly cemented in some pedons. It is more than 15 percent calcium carbonate equivalent in some pedons.

Ebon Series

The Ebon series consists of deep, well drained soils on fan terraces and stream terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 40 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are clayey-skeletal, mixed, hyperthermic Typic Haplargids.

Typical pedon of Ebon very gravelly loam, 1 to 8 percent slopes, about 150 feet south and 2,200 feet west of the northeast corner of sec. 2, T. 1 N., R. 7 E.

A1—0 to 1 inch; light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; few very fine vesicular pores and common fine and very fine tubular pores; 45 percent fine and medium pebbles; noneffervescent; moderately alkaline; gradual wavy boundary.

B21t—1 inch to 11 inches; yellowish red (5YR 5/6) very gravelly clay, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine roots; few very fine tubular pores and common fine and very fine interstitial pores; common thin clay films lining pores and on faces of peds; 35 percent fine and medium pebbles; noneffervescent; moderately alkaline; clear wavy boundary.

B22tca—11 to 24 inches; yellowish red (5YR 5/6) very gravelly sandy clay, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many very fine roots; few fine tubular pores and many fine interstitial pores; common thin clay films lining pores and on faces of peds; common pressure faces; 40 percent fine and medium pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

B23t—24 to 43 inches; yellowish red (5YR 5/6) very gravelly sandy clay, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; extremely hard, friable, sticky and plastic; common fine roots; few fine tubular pores and many fine interstitial pores; few moderately thick clay films lining pores and on faces of peds; 55 percent fine and medium pebbles; slightly effervescent; moderately alkaline; abrupt wavy boundary.

IICca—43 to 60 inches; white (5YR 8/1) gravelly loamy sand, variegated pinkish white (7.5YR 8/2) and brown (7.5YR 4/4) moist; massive; extremely hard, firm; few fine tubular pores; 25 percent fine and medium pebbles; violently effervescent; moderately alkaline.

The A horizon has hue of 10YR to 5YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 6 when dry or moist. It is very gravelly loam or very gravelly clay loam.

The B horizon has hue of 7.5YR to 2.5YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 4 to 8 when dry or moist. It is clay or sandy clay and is 35 to 85 percent coarse fragments.

The Cca horizon is loamy sand or sandy loam and is 20 to 85 percent coarse fragments. It is weakly cemented in some pedons, and it is more than 15 percent calcium carbonate equivalent in some pedons.

Estrella Series

The Estrella series consists of deep, well drained soils on alluvial fans. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents.

Typical pedon of an Estrella loam that is calcareous throughout, in an area of Estrella loams, about 2,200 feet east and 2,630 feet north of the southwest corner of sec. 1, T. 3 N., R 3 E.

A1—0 to 1 inch; brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, very friable, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 5 percent fine pebbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

C1—1 inch to 21 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; 8 percent fine pebbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

IIB21tcab—21 to 33 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; few very fine tubular and interstitial pores; few thin clay films on faces of peds and lining pores; 10 percent fine and medium pebbles; violently effervescent; common fine lime masses and filaments; moderately alkaline; gradual wavy boundary.

IIB22tcab—33 to 55 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; few very fine tubular and interstitial pores; few thin clay films on faces of peds and lining pores; 10 percent fine and medium pebbles; violently effervescent; common fine soft lime masses and filaments; gradual wavy boundary.

IIIC2ca—55 to 67 inches; pinkish white (7.5YR 8/2) gravelly sandy loam, reddish yellow (5YR 6/4) moist; massive; extremely hard, extremely firm; few very fine interstitial and tubular pores; 30 percent fine and medium pebbles.

Depth to the buried B2t horizon ranges from 20 to 39 inches.

The A and C horizons have hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 6 when dry or moist. They are loam or very fine sandy loam. Thin strata of coarser textured material are in some pedons.

The IIB2tcab horizon has hue of 7.5YR or 5YR, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. It is clay loam or sandy clay loam.

Gachado Series

The Gachado series consists of very shallow and shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from andesite, rhyolite, tuff, and volcanic breccia. Slope is 5 to 55 percent. Elevation is 1,200 to 3,000 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic Lithic Haplargids.

Typical pedon of a Gachado very gravelly sandy loam, in an area of Gachado-Lomitas complex, 8 to 25 percent slopes, about 500 feet north and 1,500 feet east of the southwest corner of sec. 29, T. 6 N., R. 1 E.

A1—0 to 2 inches; brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine interstitial pores; 38 percent pebbles; noneffervescent; mildly alkaline; clear smooth boundary.

B2t—2 to 8 inches; yellowish red (5YR 4/6) very gravelly sandy clay loam, reddish brown (5YR 5/3) moist; weak fine subangular blocky structure parting to moderate medium granular; slightly hard, very friable, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular and interstitial pores; few moderately thick clay films lining pores and on faces of peds; 54 percent pebbles; noneffervescent; moderately alkaline; clear wavy boundary.

Cr—8 to 15 inches; brown (7.5YR 5/4) weathered volcanic breccia, light brown (7.5YR 6/4) moist; massive; very hard, very firm, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; gradual wavy boundary.

R—15 inches; volcanic breccia.

Thickness of the profile ranges from 4 to 18 inches. Depth to unweathered bedrock is less than 20 inches. The control section averages more than 35 percent coarse fragments. Lime accumulations range from a concentration of filaments in the profile to a weakly cemented layer of lime on the surface of the bedrock. The profile is effervescent throughout in some pedons. A Btca or Cca horizon is in some pedons.

The A horizon has hue of 7.5YR or 5YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 3 to 6. It is very gravelly sandy loam or very gravelly loam.

The B horizon has hue of 7.5YR or 5YR, value of 4 to 7 when dry or moist, and chroma of 4 to 8. It is very gravelly sandy clay loam or very gravelly clay loam.

Gadsden Series

The Gadsden series consists of deep, well drained soils on flood plains. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 1,800 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine, montmorillonitic (calcareous), hyperthermic Vertic Torrifluvents.

Typical pedon of Gadsden clay, about 1,500 feet north and 1,700 feet east of the southwest corner of sec. 13, T. 4 N., R. 4 W.

A1—0 to 3 inches; light reddish brown (5YR 6/4) clay, dark reddish brown (5YR 3/4) moist; moderate medium platy structure; hard, firm, very sticky and very plastic; many very fine roots; many very fine tubular pores; 5 percent fine pebbles; moderately alkaline; abrupt smooth boundary.

C1—3 to 34 inches; light reddish brown (5YR 6/3) clay, reddish brown (5YR 4/3) moist; moderate medium angular blocky structure; hard, firm, very sticky and very plastic; many very fine roots and few fine and medium roots; many very fine interstitial pores and common very fine tubular pores; 5 percent fine pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

C2—34 to 60 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/3) moist; moderate medium

angular blocky structure; hard, firm, very sticky and very plastic; few very fine and fine roots and common medium roots; common fine tubular and interstitial pores; common fine lime masses; 5 percent fine pebbles; strongly effervescent; moderately alkaline.

The A and C horizons have hue of 5YR or 7.5YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 4. The C horizon is dominantly clay, but it ranges to silty clay or sandy clay.

Gila Series

The Gila series consists of deep, well drained soils on alluvial fans and flood plains. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are coarse-loamy, mixed (calcareous), thermic Typic Torrifluvents.

Typical pedon of a Gila fine sandy loam that is calcareous throughout, in an area of Gila fine sandy loams, about 1,600 feet east and 100 feet south of the northwest corner of sec. 11, T. 7 N., R. 10 W.

A11—0 to 2 inches; light yellowish brown (10YR 6/4) fine sandy loam, brown (10YR 4/3) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; strongly effervescent; moderately alkaline; gradual wavy boundary.

A12—2 to 5 inches; light yellowish brown (10YR 6/4) very fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine roots; few very fine interstitial pores; strongly effervescent; moderately alkaline; clear smooth boundary.

C1ca—5 to 28 inches; light yellowish brown (10YR 6/4) very fine sandy loam, dark yellowish brown (10YR 4/6) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; violently effervescent; moderately alkaline; clear smooth boundary.

C2ca—28 to 50 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; violently effervescent; moderately alkaline; gradual wavy boundary.

C3ca—50 to 60 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 5 percent pebbles; violently effervescent; moderately alkaline.

A buried argillic horizon is below a depth of 40 inches in some pedons.

The A and C horizons have hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 6. The C horizon is mainly loam, silt loam, fine sandy loam, or very fine sandy loam, but it commonly has thin strata of finer or coarser textured material. Lime filaments are in some pedons, and the horizon is saline in some pedons. The content of coarse fragments is less than 15 percent. Reaction is dominantly moderately alkaline, but it is strongly alkaline in a few pedons.

Gilman Series

The Gilman series consists of deep, well drained soils on alluvial fans and flood plains. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents.

Typical pedon of a Gilman loam that is calcareous in the upper 5 inches, in an area of Gilman loams, about 1,100 feet north and 30 feet west of the southeast corner of sec. 24, T. 3 N., R. 4 E.

A1—0 to 1 inch; reddish yellow (7.5YR 6/6) loam, brown (7.5YR 5/4) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and very fine tubular pores; moderately alkaline; noneffervescent; abrupt smooth boundary.

C1—1 inch to 5 inches; reddish yellow (7.5YR 6/6) loam, strong brown (7.5YR 5/6) moist; massive; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; moderately alkaline; noneffervescent; clear smooth boundary.

C2—5 to 14 inches; reddish yellow (7.5YR 6/6) loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many fine and medium tubular pores; moderately alkaline; slightly effervescent; gradual wavy boundary.

C3—14 to 27 inches; reddish yellow (7.5YR 6/6) very fine sandy loam, strong brown (7.5YR 5/6) moist; massive; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and medium tubular pores; 5 percent fine rounded

pebbles; moderately alkaline; slightly effervescent; gradual wavy boundary.

C4—27 to 43 inches; reddish yellow (7.5YR 6/6) very fine sandy loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and very fine roots; common fine and very fine tubular pores; 5 percent fine rounded pebbles; strongly alkaline; slightly effervescent; gradual wavy boundary.

C5—43 to 60 inches; reddish yellow (7.5YR 7/6) fine sandy loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and very fine roots; few fine and very fine tubular pores; strongly alkaline; noneffervescent.

The A and C horizons have hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 6 when dry or moist. The A horizon is fine sandy loam, loam, clay loam, or very fine sandy loam. Thin strata of finer or coarser textured material commonly are throughout the C horizon. Lime filaments are in some pedons. The content of coarse fragments is less than 15 percent.

A buried B2t horizon is at a depth of more than 40 inches in some pedons.

Glenbar Series

The Glenbar series consists of deep, well drained soils on flood plains and alluvial fans. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine-silty, mixed (calcareous), hyperthermic Typic Torrifluvents.

Typical pedon of a Glenbar loam that is calcareous throughout, in an area of Glenbar loams, about 1,620 feet east and 2,630 feet north of the southwest corner of sec. 35, T. 4 N., R. 4 E.

A1—0 to 6 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, friable, sticky and plastic; many fine and medium roots; common very fine tubular and interstitial pores; 1 percent fine pebbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

C1—6 to 22 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, sticky and plastic; many fine and few medium roots; common very fine and fine tubular pores and few fine interstitial pores; 5 percent fine pebbles; slightly effervescent; few fine lime filaments; moderately alkaline; clear wavy boundary.

C2—22 to 48 inches; light brown (7.5YR 6/4) silty clay loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many fine and medium roots; common very fine and fine lime filaments; moderately alkaline; abrupt wavy boundary.

IIB21tcab—48 to 60 inches; light reddish brown (5YR 6/4) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; very hard, firm, sticky and plastic; common fine roots; common very fine and fine tubular pores; few moderately thick clay films on faces of peds and lining pores; 20 percent fine and medium pebbles; common fine pinkish white (5YR 8/2) lime filaments and soft masses of lime; violently effervescent; moderately alkaline.

The control section averages 18 to 35 percent clay. Strata of very fine sandy loam and sandy loam are in some pedons. The profile commonly is micaceous. Generally, a few lime filaments are in the lower part of the profile. A IIB2t horizon is present in some pedons.

The A and C horizons have hue of 10YR to 5YR, value of 4 to 7 when dry or moist, and chroma of 2 to 4 when dry or moist. The A1 horizon is loam or clay loam. The C horizon is heavy loam, clay loam, or silty clay loam.

Gran Series

The Gran series consists of shallow, well drained soils on pediments, hill slopes, and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from coarse-grained acid igneous rock. Slope is 1 to 65 percent. Elevation is 1,800 to 4,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are clayey-skeletal, mixed, thermic, shallow Typic Haplargids.

Typical pedon of a Gran very gravelly sandy loam, in an area of Gran-Wickenburg complex, 1 to 10 percent slopes, about 1,100 feet south and 50 feet east of the northwest corner of sec. 6, T. 4 N., R. 6 E.

A1—0 to 1 inch; reddish yellow (7.5YR 6/6) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, friable, nonsticky and nonplastic; many fine and very fine roots; common very fine vesicular pores and few very fine tubular and interstitial pores; 60 percent fine and very fine pebbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

B2t—1 inch to 12 inches; light red (2.5YR 6/8) extremely gravelly sandy clay, red (2.5YR 5/8) moist; moderate medium prismatic structure parting to strong medium angular blocky; hard, friable, sticky

and plastic; many fine and very fine roots; many fine and very fine interstitial pores; many moderately thick and thick clay films on faces of peds and lining pores; common pressure faces; 85 percent medium and fine pebbles; noneffervescent; moderately alkaline; gradual irregular boundary.

Cr—12 to 36 inches; light red (2.5YR 6/8) partially weathered granitic rock (grus); few very fine roots; common thin clay films coating bedrock and in fractures; diffuse boundary.

R—36 inches; granitic rock; extremely hard.

Depth to weathered bedrock ranges mainly from 10 to 20 inches, but it is as little as 3 inches. Depth to unweathered bedrock ranges from 20 to 40 inches. The profile generally is noneffervescent throughout, and it is mildly alkaline or moderately alkaline.

The A horizon has hue of 10YR to 5YR, but it is dominantly 7.5YR. It has value of 4 to 7 when dry and chroma of 4 to 8.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6 when dry, and chroma of 4 to 8. It is sandy clay or clay and is more than 35 percent gravel and 35 percent clay.

The Cr horizon has the same texture and structure as the underlying granitic material, but it is easily crushed by hand or with a hammer. Clay coatings are on the fracture faces of the partially weathered granitic material.

Greyeagle Series

The Greyeagle series consists of shallow and very shallow, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 40 percent. Elevation is 1,800 to 3,300 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy-skeletal, mixed, thermic, shallow Typic Durorthids.

Typical pedon of a Greyeagle very gravelly loam, in an area of Greyeagle-Continental-Nickel association, 1 to 40 percent slopes, about 1,200 feet north and 2,300 feet west of the southeast corner of sec. 1, T. 6 N., R. 8 W.

A11—0 to 1 inch; pink (7.5YR 7/4) very gravelly loam, brown (7.5YR 5/4) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine vesicular pores; 39 percent fine and medium subrounded pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

A12—1 inch to 5 inches; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4) moist; weak coarse and very coarse granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 30 percent fine and medium subrounded pebbles; violently effervescent; moderately alkaline; gradual wavy boundary.

C1ca—5 to 10 inches; light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; loose, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 54 percent weakly cemented pan fragments and pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2sicam—10 inches; pinkish white (7.5YR 8/2), indurated, silica-cemented duripan, laminar layer on surface; extremely hard; violently effervescent.

Depth to the duripan ranges from 4 to 20 inches, but it is dominantly 4 to 12 inches. The control section ranges from 35 to 80 percent coarse fragments.

The A horizon has hue of 10YR or 7.5YR, value of 5 to 7 when dry or moist, and chroma of 3 or 4.

The Cca horizon has hue of 10YR or 7.5YR, value of 4 to 8 when dry or moist, and chroma of 2 to 4. It is very gravelly or extremely gravelly loam or sandy loam that is 35 to 80 percent coarse fragments and pan fragments.

Guest Series

The Guest series consists of deep, well drained soils on flood plains. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 1 percent. Elevation is 2,200 to 2,400 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are fine, mixed (calcareous), thermic Veritic Torrifluvents.

Typical pedon of Guest clay about 750 feet west and 2,450 feet south of the northeast corner of sec. 9, T. 7 N., R. 8 W.

A1—0 to 2 inches; brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine and fine roots; few very fine and common medium tubular pores; moderately alkaline; abrupt smooth boundary.

IIC1—2 to 39 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong very coarse prismatic structure parting to strong medium subangular blocky; very hard, firm, very sticky and very plastic; common very fine and fine roots; few very fine tubular pores; strongly effervescent; few fine soft masses of lime; moderately alkaline; clear smooth boundary.

IIC2ca—39 to 60 inches; light brown (7.5YR 6/5) clay loam, dark brown (7.5YR 4/5) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; no roots observed; common very fine tubular

and interstitial pores; violently effervescent; many fine soft masses of lime; strongly alkaline.

Depth to carbonates is 0 to 10 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. The horizon is clay loam or clay.

The C horizon has value of 4 to 6 when dry and 3 to 5 when moist, and it has chroma of 3 to 6 when dry or moist. The dominant texture is clay, but the range includes clay loam in the lower part of the C horizon.

Gunsight Series

The Gunsight series consists of deep, well drained, strongly calcareous soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 40 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic Typic Calciorthids.

Typical pedon of a Gunsight very gravelly sandy loam, in an area of Carrizo-Gunsight complex, 1 to 5 percent slopes, about 1,100 feet south of the northwest corner of sec. 28, T. 3 N., R. 4 W.

A11—0 to 1 inch; light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 4/4) moist; weak fine and medium granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 38 percent pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

A12—1 inch to 10 inches; light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; 43 percent pebbles; violently effervescent; moderately alkaline; gradual wavy boundary.

C1ca—10 to 36 inches; pinkish white (7.5YR 8/2) very gravelly sandy loam, pink (7.5YR 8/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few very fine interstitial pores; 59 percent pebbles; violently effervescent; moderately alkaline; gradual wavy boundary.

IIC2ca—36 to 45 inches; pinkish white (7.5YR 8/2) very gravelly sandy loam, pink (7.5YR 8/4) moist; massive; hard, firm, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 55 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

IIIBtb—45 to 60 inches; yellowish red (5YR 5/8) gravelly sandy clay loam, yellowish red (5YR 5/6) moist; massive; hard, firm, slightly sticky and slightly plastic; common very fine interstitial pores; few thin clay films bridging and staining mineral grains; 21 percent pebbles; noneffervescent; moderately alkaline.

Depth to the calcic horizon ranges from 3 to 20 inches. The content of gravel is more than 35 percent in the control section.

The A horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 4 or 5 when moist, and chroma of 3 or 4. It is slightly effervescent to violently effervescent. It is very gravelly sandy loam or very gravelly loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 8 when moist, and chroma of 2 to 4. It is strongly effervescent or violently effervescent and is weakly cemented in some pedons. It is very gravelly sandy loam, very gravelly loam, or extremely gravelly loam. Some pedons do not have a buried argillic horizon.

Lehmans Series

The Lehmans series consists of very shallow and shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived from basalt, andesite, rhyolite, tuff, and agglomerate. Slope is 8 to 65 percent. Elevation is 1,800 to 4,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are clayey, montmorillonitic, thermic Lithic Haplargids.

Typical pedon of a Lehmans very gravelly clay loam, in an area of Lehmans-Rock outcrop complex, low precipitation, 8 to 65 percent slopes, about 2,290 feet west and 450 feet south of the northeast corner of sec. 7, T. 6 N., R. 5 W.

A—0 to 2 inches; reddish brown (5YR 5/3) very gravelly clay loam, reddish brown (10YR 4/3) moist; weak thin platy structure; slightly hard, friable, sticky and plastic; common fine and very fine roots; common very fine tubular pores and few medium vesicular pores; 50 percent pebbles; slightly effervescent; mildly alkaline; clear smooth boundary.

B1t—2 to 6 inches; reddish brown (5YR 4/3) clay loam, dark reddish brown (2.5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; few coarse and medium roots and common very fine roots; common fine tubular pores; 10 percent pebbles; slightly effervescent; mildly alkaline; abrupt smooth boundary.

B2t—6 to 15 inches; reddish brown (5YR 5/3) clay, dark reddish brown (2.5YR 3/4) moist; moderate medium

prismatic structure; very hard, friable, very sticky and very plastic; few medium and fine roots and common very fine roots; common fine tubular pores and common fine interstitial pores; few thin clay films on faces of peds; 10 percent pebbles; strongly effervescent; mildly alkaline; clear wavy boundary.

Cca—15 to 20 inches; reddish brown (5YR 5/3) clay loam, reddish brown (5YR 5/4) moist; massive; hard, friable, slightly sticky and plastic; common fine roots; few fine tubular pores and common fine interstitial pores; common soft lime masses; 10 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

R—20 inches; white (10YR 8/1) and reddish brown (2.5YR 5/4) rhyolite.

Depth to unweathered bedrock ranges from 6 to 20 inches. About 25 to 75 percent of the surface is covered with coarse fragments. The profile is 10 to 30 percent coarse fragments. Reaction is mildly alkaline or moderately alkaline throughout.

The A horizon has hue of 7.5YR or 5YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 2 to 6. The B horizon has hue of 7.5YR to 2.5YR, value of 4 or 5 when dry and 3 to 5 when moist, and chroma of 3 to 6. It is gravelly clay loam, clay, or gravelly clay. The C horizon is clay loam, gravelly sandy clay loam, or gravelly clay loam.

Lomitas Series

The Lomitas series consists of shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived from andesite, rhyolite, tuff, and volcanic breccia. Slope is 7 to 55 percent. Elevation is 1,200 to 3,000 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic Lithic Camborthids.

Typical pedon of a Lomitas extremely gravelly sandy loam, in an area of Gachado-Lomitas complex, 8 to 25 percent slopes, about 2,600 feet west and 950 feet north of the southeast corner of sec. 29, T. 6 N., R. 1 E.

A1—0 to 2 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak fine and very fine granular structure; slightly hard, friable, nonsticky and nonplastic; many fine and very fine roots; many fine interstitial pores; 75 percent pebbles and 10 percent cobbles; strongly effervescent; strongly alkaline; abrupt smooth boundary.

B1—2 to 6 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine and very fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many fine and common medium roots; many fine and very fine tubular pores; 40 percent pebbles and 10 percent cobbles; strongly effervescent; strongly alkaline; clear smooth boundary.

B2—6 to 17 inches; light brown (7.5YR 6/3) extremely gravelly sandy loam, brown (7.5YR 5/4) moist; weak fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and common medium roots; many very fine tubular pores; 20 percent cobbles and 45 percent pebbles; strongly effervescent; strongly alkaline; abrupt irregular boundary.

IICr—17 to 20 inches; partially weathered and highly fractured volcanic breccia; many calcium carbonate coatings in joints; clear smooth boundary.

IIR—20 inches; volcanic breccia.

Thickness of the soil ranges from 10 to 18 inches. Depth to unweathered bedrock is less than 20 inches. The control section averages more than 35 percent coarse fragments. Lime generally accumulates on bedrock surfaces and in fractures, but the soil is noneffervescent in the upper part of some pedons.

The A horizon has hue of 10YR or 7.5YR, value of 4 to 7 when dry and 4 or 5 when moist, and chroma of 3 to 6. It is very gravelly sandy loam or extremely gravelly sandy loam.

The B horizon has hue of 7.5YR or 5YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 3 to 6. It is very gravelly sandy loam and extremely gravelly sandy loam.

A Cr horizon is present in some pedons.

Luke Series

The Luke series consists of moderately deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 8 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is about 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are clayey-skeletal, mixed, hyperthermic Typic Durargids.

Typical pedon of a Luke very gravelly sandy clay loam, in an area of Luke-Cipriano association, 1 to 15 percent slopes, about 2,100 feet north and 410 feet west of the southeast corner of sec. 27, T. 6 N., R. 2 W.

A1—0 to 1 inch; yellowish red (5YR 5/6) very gravelly sandy clay loam, yellowish red (5YR 4/6) moist; moderate thin platy structure; slightly hard, friable, sticky and plastic; many very fine roots; many very fine interstitial pores; 45 percent pebbles and 5 percent cobbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

B21t—1 inch to 2 inches; yellowish red (5YR 5/6) very gravelly sandy clay, yellowish red (5YR 4/6) moist; moderate fine subangular blocky structure; slightly hard, friable, very sticky and very plastic; many very fine and few fine roots; common very fine tubular pores and few very fine interstitial pores; 50 percent pebbles; few thin clay films on faces of peds and lining pores; noneffervescent; moderately alkaline; clear smooth boundary.

B22t—2 to 14 inches; red (2.5YR 5/6) very gravelly clay, dark red (2.5YR 3/6) moist; strong medium subangular blocky structure; hard, friable, very sticky and very plastic; many very fine roots; common very fine tubular pores and few very fine interstitial pores; 40 percent pebbles; common thin clay films on faces of peds and lining pores; noneffervescent; moderately alkaline; clear wavy boundary.

B23t—14 to 28 inches; red (2.5YR 5/6) extremely gravelly clay, red (2.5YR 4/6) moist; moderate medium subangular blocky structure; hard, friable, very sticky and very plastic; common very fine roots; few very fine tubular pores; 75 percent pebbles; few thin clay films on faces of peds and lining pores; noneffervescent; moderately alkaline; abrupt wavy boundary.

C1sicam—28 to 34 inches; pink (5YR 8/3) silica-cemented hardpan that has a laminar surface; slightly effervescent; moderately alkaline; clear wavy boundary.

C2sica—34 to 60 inches; pink (5YR 8/3) weakly to strongly silica- and lime-cemented material that crushes to extremely gravelly loamy sand, pink (5YR 7/4) moist; few very fine tubular pores; 70 percent pebbles; strongly effervescent; moderately alkaline.

Depth to the duripan ranges from 20 to 40 inches. Thickness of the duripan ranges from 1 inch to 6 inches. The profile is mildly alkaline or moderately alkaline.

The A1 horizon has hue of 5YR or 7.5YR, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. The structure is platy or granular.

The B3t horizon has hue of 5YR or 2.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 4 or 6 when dry or moist. It is clay or sandy clay and is 35 to 85 percent gravel. The structure is prismatic, subangular blocky, or angular blocky.

Maripo Series

The Maripo series consists of deep, well drained soils on flood plains and low stream terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 2,100 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents.

Typical pedon of a Maripo sandy loam, in an area of Antho-Carrizo-Maripo complex, about 2,560 feet north and 2,100 feet east of the southwest corner of sec. 23, T. 5 N., R. 1 E.

A1—0 to 1 inch; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, friable, nonsticky and nonplastic; many very fine roots; common very fine tubular and interstitial pores; 1 percent fine pebbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

C1—1 inch to 18 inches; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many fine interstitial pores and few fine tubular pores; 3 percent pebbles; slightly effervescent; moderately alkaline; gradual wavy boundary.

C2—18 to 29 inches; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and few medium roots; common very fine and few fine interstitial pores; 4 percent pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

IIC3—29 to 60 inches; light brown (7.5YR 6/4) very gravelly loamy sand, dark brown (7.5YR 4/4) moist; massive; loose; common fine and very fine roots; few fine interstitial pores; 55 percent pebbles and cobbles; strongly effervescent; moderately alkaline.

Depth to the IIC horizon is 20 to 36 inches, but it averages about 25 inches. The profile has hue of 10YR to 7.5YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 5 when dry or moist. The C horizon is fine sandy loam, sandy loam, or coarse sandy loam. It is slightly effervescent or strongly effervescent. The IIC horizon is loamy sand, coarse sand, or sand and is 15 to 60 percent coarse fragments.

Mohall Series

The Mohall series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 8 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine-loamy, mixed, hyperthermic Typic Haplargids.

Typical pedon of Mohall clay loam, about 600 feet north and 1,550 feet east of the southwest corner of sec. 12, T. 5 N., R. 3 E.

A1—0 to 2 inches; light brown (7.5YR 6/4) clay loam, dark brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, friable, sticky and plastic; many very fine roots; many very fine tubular pores; 1 percent very fine pebbles; noneffervescent; moderately alkaline; clear smooth boundary.

B1—2 to 5 inches; light brown (7.5YR 6/4) clay loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; many fine and very fine tubular pores; few moderately thick clay films lining pores; 1 percent very fine pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

B21t—5 to 21 inches; light brown (7.5YR 6/4) clay loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; many fine and very fine roots; many fine and very fine tubular pores; common thin clay films lining pores and few moderately thick clay films on faces of peds; 1 percent very fine pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

B22tca—21 to 31 inches; light reddish brown (5YR 6/4) clay loam, reddish brown (5YR 4/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and plastic; many very fine roots; many fine and very fine tubular pores and few very fine interstitial pores; common moderately thick clay films lining pores and on faces of peds; 1 percent very fine pebbles; few very fine lime filaments; strongly effervescent; moderately alkaline; clear wavy boundary.

B3ca—31 to 42 inches; light brown (7.5YR 6/4) clay loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine lime filaments; strongly effervescent; moderately alkaline; clear smooth boundary.

IIC1—42 to 60 inches; light reddish brown (5YR 6/4) extremely cobbly loamy sand, reddish brown (5YR 4/4) moist; single grain; loose; few very fine roots; 50 percent cobbles and 30 percent pebbles; slightly effervescent; moderately alkaline.

Depth to a calcic horizon ranges from 6 to 40 inches.

The A horizon has hue of 5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 6 when dry or moist. It is sandy loam, loam, clay loam, or clay. It ranges from noneffervescent to violently effervescent.

The B horizon has hue of 7.5YR or 5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 4 to 8 when dry or moist. It is clay loam, sandy clay loam, or loam. Structure ranges from weak to strong and from fine to coarse. The B horizon is noneffervescent to violently effervescent.

A Cca horizon is in some pedons. It is loam, sandy loam, sandy clay loam, light clay loam, or loamy sand. The content of coarse fragments in the C horizon is as much as 80 percent below a depth of 40 inches, but it is dominantly less than 15 percent.

Mohave Series

The Mohave series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 8 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are fine-loamy, mixed, thermic Typic Haplargids.

Typical pedon of Mohave sandy loam, about 2,400 feet east and 2,650 feet south of the northwest corner of sec. 4, T. 7 N., R. 8 W.

A1—0 to 2 inches; light brown (7.5YR 6/4) sandy loam, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular and interstitial pores; 8 percent fine rounded pebbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

B21t—2 to 11 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; common moderately thick clay films on faces of peds and lining pores; noneffervescent; moderately alkaline; clear smooth boundary.

B22tca—11 to 20 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; few thin clay films on faces of peds and lining pores; strongly effervescent; common lime filaments; moderately alkaline; clear smooth boundary.

IIC1—20 to 35 inches; light brown (7.5YR 6/5) loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; no roots observed; common very fine tubular pores; strongly effervescent; few lime filaments; moderately alkaline; abrupt smooth boundary.

IIC2ca—35 to 60 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine and fine tubular pores; common lime filaments and soft masses; violently effervescent; moderately alkaline.

Depth to a calcic horizon ranges from 6 to 40 inches.

The A horizon has hue of 5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 6 when dry or moist. It is sandy loam, gravelly sandy loam, loam, clay loam, or clay. It ranges from noneffervescent to violently effervescent.

The B horizon has hue of 7.5YR or 5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 4 to 8 when dry or moist. It is clay loam, sandy clay loam, or loam. Structure is weak to strong, fine to coarse angular and subangular blocky. The B2t horizon ranges from noneffervescent to violently effervescent.

The C horizon is loam, sandy loam, clay loam, or sandy clay loam. The content of gravel generally ranges from 0 to 15 percent, but is as much as 80 percent below a depth of 40 inches in a few pedons. In a few pedons, the Cca horizon is weakly cemented.

Momoli Series

The Momoli series consists of deep, well drained soils on stream terraces and fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 5 percent. Elevation is 1,400 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 350 days.

These soils are loamy-skeletal, mixed, hyperthermic Typic Camborthids.

Typical pedon of a Momoli gravelly sandy loam, in an area of Gilman-Momoli-Denure complex, about 800 feet south and 1,400 feet east of the northwest corner of sec. 33, T. 5 N., R. 2 W.

A1—0 to 1 inch; light brown (7.5YR 6/3) gravelly sandy loam, brown (7.5YR 4/3) moist; moderate very fine, fine, and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine and fine interstitial pores; 16 percent pebbles; noneffervescent; neutral; clear smooth boundary.

B21—1 inch to 10 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial and tubular pores; 20 percent pebbles; slightly effervescent; neutral; abrupt wavy boundary.

B22—10 to 22 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial and tubular pores; 20 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

IIC1—22 to 60 inches; light brown (7.5YR 6/4) extremely gravelly sandy loam, brown (7.5YR 4/4) moist; weak medium and coarse subangular blocky structure, single grain in parts that have highest gravel content; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine and fine interstitial and tubular pores; 63 percent pebbles; strongly effervescent; moderately alkaline.

The profile is effervescent at a depth of 10 inches or less; in some pedons it is effervescent throughout. The control section averages 35 to 65 percent coarse fragments. The fragments are rounded and generally are pebbles, but cobbles are in some pedons. Lime is disseminated, or it occurs as a few filaments and thin coatings on pebbles. A buried argillic or calcic horizon is in some pedons at a depth of more than 40 inches.

The A horizon has hue of 7.5YR, value of 5 or 6 when dry, and chroma of 3 or 4 when dry. It is sandy loam, and the content of coarse fragments ranges from 15 to 60 percent.

The B horizon has hue of 7.5YR, value of 5 or 6, and chroma of 3 or 4. It is sandy loam or loam, and the content of coarse fragments ranges from 25 to 75 percent.

Nickel Series

The Nickel series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 40 percent. Elevation is 1,800 to 3,300 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy-skeletal, mixed, thermic Typic Calciorthids.

Typical pedon of a Nickel gravelly sandy loam, in an area of Nickel-Cave complex, 8 to 30 percent slopes, about 1,300 feet east and 1,600 feet north of the southwest corner of sec. 11, T. 7 N., R. 5 W.

A1—0 to 1 inch; pinkish gray (7.5YR 6/2) gravelly sandy loam, strong brown (7.5YR 4/6) moist; weak thin platy structure; slightly hard, friable, nonsticky and nonplastic; many very fine roots; common fine tubular pores; 30 percent pebbles; strongly effervescent; strongly alkaline; abrupt smooth boundary.

C1ca—1 inch to 10 inches; pinkish gray (7.5YR 6/2) gravelly loam, brown (7.5YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few medium roots; many very fine interstitial pores; common very fine lime filaments; 30 percent pebbles; strongly effervescent; strongly alkaline; clear smooth boundary.

C2ca—10 to 50 inches; pinkish gray (7.5YR 6/2) very gravelly sandy loam, brown (7.5YR 4/2) moist;

massive; slightly hard, friable, nonsticky and nonplastic; common very fine and fine roots and few medium roots; many fine interstitial pores; many very fine and fine lime filaments; 40 percent pebbles; violently effervescent; strongly alkaline; abrupt smooth boundary.

C3ca—50 to 60 inches; white (N 8/0) very gravelly loamy sand, pink (7.5YR 8/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 50 percent pebbles; violently effervescent; strongly alkaline.

Depth to a calcic horizon ranges from 3 to 20 inches, but it averages about 8 inches. A buried argillic horizon is in some pedons at a depth of more than 45 inches. The content of gravel is more than 35 percent in the control section.

The A horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 4 or 5 when moist, and chroma of 2 to 6. It is slightly effervescent to violently effervescent. It is very gravelly loam, gravelly sandy loam, or very gravelly sandy loam.

The C horizon has hue of 7.5YR, 10YR, or neutral, value of 5 to 8 when dry and 4 to 8 when moist, and chroma of 0 to 4 when dry or moist. It is strongly effervescent or violently effervescent, and it is weakly cemented in some pedons. It is very gravelly sandy loam, very gravelly loam, gravelly loam, or very gravelly loamy sand.

Ohaco Series

The Ohaco series consists of moderately deep, well drained soils on stream terraces and fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are fine, mixed, thermic Typic Durargids.

Typical pedon of Ohaco gravelly loam, about 2,100 feet west and 500 feet north of the southeast corner of sec. 36, T. 7 N., R. 8 W.

A1—0 to 2 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 4/4) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine interstitial pores; 20 percent medium and coarse pebbles and 5 percent cobbles; noneffervescent; moderately alkaline; clear smooth boundary.

B1t—2 to 7 inches; yellowish red (5YR 5/6) clay loam, reddish brown (5YR 4/3) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and plastic; common very fine and fine roots; few very fine interstitial pores; few thin clay films on faces of peds; 5 percent pebbles; noneffervescent; moderately alkaline; clear smooth boundary.

B21tca—7 to 11 inches; yellowish red (5YR 4/6) clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; common very fine and fine tubular and interstitial pores; few thin clay films lining pores and bridging mineral grains; 5 percent medium pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

B22tca—11 to 16 inches; yellowish red (5YR 4/6) clay loam, dark reddish brown (5YR 3/4) moist; strong coarse subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; few very fine tubular pores and common very fine interstitial pores; few thin clay films lining pores and bridging mineral grains; 5 percent medium pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

B23tca—16 to 27 inches; yellowish red (5YR 4/6) clay, dark reddish brown (5YR 3/4) moist; strong coarse angular blocky structure; very hard, firm, very sticky and plastic; common very fine roots; common very fine tubular pores; common moderately thick clay films lining pores and on faces of peds; 15 percent medium pebbles; disseminated lime and common lime filaments; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—27 to 31 inches; pink (5YR 8/3) gravelly sandy loam, light reddish brown (5YR 6/4) moist; massive; slightly hard, firm, slightly sticky and nonplastic; common very fine interstitial pores; 20 percent medium pebbles; violently effervescent; moderately alkaline; gradual wavy boundary.

IIC2sicam—31 to 35 inches; pinkish white (5YR 8/2) and pink (5YR 8/3), indurated, silica- and lime-cemented duripan; thin laminar layer on the upper surface; massive; extremely hard; violently effervescent.

Depth to the duripan ranges from 20 to 40 inches, but it is dominantly 30 to 36 inches. The thickness of the duripan ranges from 4 to 24 inches.

The A horizon has hue of 7.5YR or 5YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. It is noneffervescent to strongly effervescent.

The B2t horizon has hue of 7.5YR or 5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. It is clay or clay loam. The content of coarse fragments is less than 15 percent. The structure is prismatic, angular blocky, or subangular blocky.

Pinaleno Series

The Pinaleno series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 40 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy-skeletal, mixed, thermic Typic Haplargids.

Typical pedon of a Pinaleno very gravelly clay loam, in an area of Pinaleno-Tres Hermanos complex, low precipitation, 1 to 10 percent slopes, about 2,400 feet west and 3,300 feet south of the northeast corner of sec. 1, T. 6 N., R. 8 W.

A1—0 to 1 inch; yellowish red (5YR 5/6) very gravelly clay loam, reddish brown (5YR 4/4) moist; weak thick platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial pores; 40 percent medium pebbles and 5 percent cobbles; noneffervescent; moderately alkaline; clear smooth boundary.

B1t—1 inch to 5 inches; yellowish red (5YR 5/6) gravelly clay loam, reddish brown (5YR 4/4) moist; weak fine granular structure; slightly hard, very friable, sticky and plastic; common very fine roots; few very fine tubular and interstitial pores; few thin clay films bridging mineral grains; 26 percent fine and medium pebbles; noneffervescent; moderately alkaline; clear wavy boundary.

B2t—5 to 12 inches; yellowish red (5YR 5/6) very gravelly clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; common very fine tubular pores; common moderately thick clay films lining pores and on faces of peds; 55 percent coarse pebbles; common fine lime filaments; strongly effervescent; moderately alkaline; gradual wavy boundary.

IIB3tca—12 to 24 inches; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular and interstitial pores; few moderately thick clay films staining mineral grains, lining pores, and on faces of peds; 34 percent fine pebbles; many medium irregularly shaped soft lime masses; violently effervescent; moderately alkaline; gradual wavy boundary.

IICca—24 to 60 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine interstitial pores; violently effervescent; moderately alkaline.

Commonly, 40 to 90 percent of the surface is covered with gravel and cobbles.

The A horizon has hue of 5YR or 10YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. The horizon is noneffervescent to strongly effervescent.

The B2t horizon generally has hue of 5YR or 7.5YR, but the range includes 2.5YR. The horizon has value of 4 to 7 when dry and 3 to 5 when moist, and it has chroma of 4 or 6 when dry or moist. It is very gravelly or extremely gravelly loam, sandy clay loam, or clay loam that is 35 to 90 percent coarse fragments. Structure is dominantly weak or moderate, fine or medium, and subangular blocky structure, but is massive in some pedons that contain larger amounts of coarse fragments. The B3tca horizon has few or common lime masses and is strongly effervescent or violently effervescent.

The Cca horizon is loam or very gravelly sandy clay loam. The content of calcium carbonate ranges from 8 to 25 percent. The horizon is strongly effervescent or violently effervescent. In some pedons it is weakly cemented.

Pinamt Series

The Pinamt series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 40 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic Typic Haplargids.

Typical pedon of a Pinamt extremely gravelly sandy loam, in an area of Pinamt-Tremant complex, 1 to 10 percent slopes, about 1,600 feet west and 150 feet north of the southeast corner of sec. 5, T. 5 N., R. 1 E.

A11—0 to 1 inch; brown (7.5YR 5/4) extremely gravelly sandy loam, dark brown (7.5YR 4/4) moist; moderate thin platy structure; soft, friable, nonsticky and nonplastic; many very fine roots; common very fine interstitial pores; 65 percent pebbles and 5 percent cobbles; slightly effervescent; moderately alkaline; abrupt wavy boundary.

A12—1 inch to 3 inches; light brown (7.5YR 6/4) very gravelly loam, strong brown (7.5YR 4/6) moist; weak very fine subangular blocky structure; soft, friable, nonsticky and slightly plastic; common very fine roots; common very fine interstitial pores; 40 percent pebbles; slightly effervescent; moderately alkaline; abrupt wavy boundary.

B21tca—3 to 15 inches; yellowish red (5YR 5/6) very gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common fine and medium roots; few fine interstitial pores and common very fine tubular pores; few thin clay films lining pores and on faces of peds; 40 percent pebbles and 5 percent cobbles; strongly effervescent; moderately alkaline; clear wavy boundary.

B3tca—15 to 28 inches; light brown (7.5YR 6/4) extremely gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; few thin clay films lining pores and on faces of peds; 50 percent pebbles and 10 percent cobbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cca—28 to 60 inches; light brown (7.5YR 6/4) extremely gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few very fine roots; 60 percent pebbles and 5 percent cobbles; strongly effervescent; moderately alkaline.

The A1 horizon is noneffervescent to strongly effervescent, and the B and C horizons are strongly effervescent or violently effervescent. The content of calcium carbonate in the Cca horizon ranges from 8 to 25 percent. A buried soil is below a depth of 40 inches in some pedons.

The A1 horizon has hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist.

A B1 horizon is in some pedons. The B2t horizon is very gravelly or extremely gravelly loam, sandy clay loam, or clay loam that is 35 to 90 percent coarse fragments. The B horizon generally has a weak or moderate, fine or medium, subangular blocky structure, but in some pedons are larger amounts of coarse fragments and the structure is massive.

In some pedons the Cca horizon is weakly cemented.

Quilotosa Series

The Quilotosa series consists of very shallow and shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from granite and gneiss. Slope is 20 to 65 percent. Elevation is 1,200 to 3,000 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed (calcareous), hyperthermic Lithic Torriorthents.

Typical pedon of a Quilotosa extremely gravelly sandy loam, in an area of Quilotosa-Vaiva-Rock outcrop complex, 20 to 65 percent slopes, about 1,900 feet north and 1,000 feet west of the southeast corner of sec. 14, T. 3 N., R. 6 W.

A1—0 to 2 inches; light brown (7.5YR 6/4) extremely gravelly sandy loam, strong brown (7.5YR 5/6) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; more than 60 percent pebbles; noneffervescent; moderately alkaline; gradual wavy boundary.

C1—2 to 8 inches; light brown (7.5YR 6/4) extremely gravelly loam, strong brown (7.5YR 5/6) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine roots; common very fine interstitial pores; more than 60 percent pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

C2ca—8 to 14 inches; light brown (7.5YR 6/4) extremely gravelly loam, brown (7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; few fine and common very fine roots; common very fine interstitial pores; more than 60 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

IICrca—14 to 18 inches; highly fractured granite; massive; common very fine roots in fractures; violently effervescent; calcium carbonate coatings on pebbles in fractures; abrupt smooth boundary.

IIR—18 inches; granite.

Thickness of the profile ranges from 2 to 14 inches. Depth to unweathered bedrock is less than 20 inches. The control section averages more than 35 percent coarse fragments. Lime accumulations commonly are at a depth of 2 or 3 inches. The A horizon has chroma of 4 or 6. It is dominantly noneffervescent, but it is effervescent in some pedons. The C horizon has chroma of 4 or 6. The Cr horizon has calcium carbonate coatings and colloidal stains on fracture faces in most pedons.

Rillito Series

The Rillito series consists of deep, well drained, strongly calcareous soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 40 percent. Elevation is 1,100 to 2,100 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are coarse-loamy, mixed, hyperthermic Typic Calciorthids.

Typical pedon of a Rillito gravelly loam, in an area of Gunsight-Rillito complex, 1 to 25 percent slopes, about 1,000 feet east and 1,450 feet south of the northwest corner of sec. 19, T. 3 N., R. 7 E.

A1—0 to 1 inch; pinkish gray (7.5YR 7/2) gravelly loam, dark brown (7.5YR 4/2) moist; weak thin platy structure; slightly hard, friable, nonsticky and slightly plastic; many very fine roots; many very fine tubular pores and common very fine interstitial pores; 30 percent pebbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

C1—1 inch to 12 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and slightly plastic; many very fine roots; many very fine tubular pores and common very fine interstitial pores; 30 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

C2ca—12 to 36 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine, fine, and medium roots; common very fine tubular and interstitial pores; 30 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

C3ca—36 to 60 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; few very fine tubular pores and common very fine interstitial pores; 45 percent pebbles; strongly effervescent; moderately alkaline.

Depth to a calcic horizon ranges from 4 to 36 inches. The content of coarse fragments ranges from 5 to 60 percent in any individual horizon, but it averages 15 to 35 percent in the control section. Most coarse fragments are pebble-sized. In some pedons the coarse fragments are dominantly lime concretions and durinodes.

The A horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 6 when moist, and chroma of 2 to 6. It is loam or gravelly loam. It is slightly effervescent to violently effervescent.

The C horizon has the same colors as the A horizon. It is dominantly gravelly loam or gravelly sandy loam. Thin strata of coarser or finer textured material are in some pedons. The C1 horizon is strongly effervescent or violently effervescent. The calcic horizon is weakly cemented in some pedons.

Sal Series

The Sal series consists of very shallow and shallow, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 5 percent. Elevation is 1,000 to 2,500 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic, shallow Typic Durargids.

Typical pedon of a Sal extremely gravelly loam, in an area of Sal-Cipriano, low precipitation, 1 to 10 percent slopes, about 1,300 feet north and 1,500 feet west of the southeast corner of sec. 33, T. 3 N., R. 4 W.

About 90 to 95 percent of the surface is covered with pebbles that have a thin desert varnish.

A2—0 to 2 inches; light brown (7.5YR 6/4) extremely gravelly loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine vesicular pores; 16 percent pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

B1tsa—2 to 7 inches; yellowish red (5YR 5/6) very gravelly clay loam, yellowish red (5YR 4/6) moist; moderate fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial pores; strongly effervescent; moderately alkaline; moderately saline; gradual wavy boundary.

B2tsa—7 to 20 inches; yellowish red (5YR 5/6) extremely gravelly clay loam, yellowish red (5YR 4/6) moist; moderate fine and medium granular structure; slightly hard, very friable, sticky and plastic; few pores; few thin clay films lining pores and on faces of peds; 70 percent pebbles; slightly effervescent; moderately alkaline; strongly saline; abrupt smooth boundary.

IICsicam—20 inches; pinkish white and pink (5YR 8/2, 7/4), indurated, silica- and lime-cemented duripan, pink and reddish yellow (5YR 8/4, 7/6) moist; thin laminar layer on the surface; massive; extremely hard; violently effervescent.

Depth to the indurated duripan ranges from 9 to 20 inches. The content of gravel is more than 35 percent in the control section. Electrical conductivity of the saturated extract ranges from 4 to 24 millimhos per centimeter in the control section. The A2 horizon is slightly effervescent to strongly effervescent. The Bt horizon is very gravelly clay loam or extremely gravelly clay loam. It is slightly effervescent or strongly effervescent.

Schenco Series

The Schenco series consists of shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from schist. Slope is 3 to 60 percent. Elevation is 1,500 to 2,200 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed (calcareous), hyperthermic, shallow Typic Torriorthents.

Typical pedon of a Schenco extremely channery loam, in an area of Schenco-Rock outcrop complex, 25 to 60 percent slopes, about 1,320 feet west and 500 feet north of the southeast corner of sec. 29, T. 6 N., R. 1 W.

A1—0 to 2 inches; reddish brown (5YR 5/4) extremely channery loam, reddish brown (5YR 4/4) moist; weak fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; 75 percent channery fragments; violently effervescent; moderately alkaline; abrupt smooth boundary.

B1—2 to 5 inches; light reddish brown (5YR 6/4) very channery loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; 50 percent channery fragments; violently effervescent; strongly alkaline; clear smooth boundary.

B2—5 to 11 inches; light reddish brown (5YR 6/4) very channery loam, reddish brown (5YR 4/4) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common fine and very fine tubular pores; 50 percent channery fragments; violently effervescent; strongly alkaline; abrupt irregular boundary.

IICr—11 to 22 inches; highly fractured and partially weathered schist; many segregated lime coatings on rock fragments and in some joints; common yellowish red (5YR 5/8) clay films in joints.

Depth to paralithic contact is 10 to 20 inches. The control section is 35 to 75 percent rock fragments.

The A1 horizon has hue of 7.5YR or 5YR, value of 5 or 6 when dry, and chroma of 3 or 4. It is slightly acid to strongly alkaline and is noneffervescent to strongly effervescent.

The B2 horizon has hue of 7.5YR or 5YR, value of 5 or 6 when dry, and chroma of 3 to 6. It is loam or clay loam and is strongly effervescent or violently effervescent.

Suncity Series

The Suncity series consists of very shallow and shallow, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 8 percent. Elevation is 1,200 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy, mixed, hyperthermic, shallow Typic Durargids.

Typical pedon of a Suncity gravelly loam, in an area of Suncity-Cipriano complex, 1 to 7 percent slopes, about 800 feet west and 100 feet north of the southeast corner of sec. 19, T. 6 N., R. 3 E.

A1—0 to 1 inch; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; 15 percent fine and medium pebbles and pan fragments; slightly effervescent; moderately alkaline; abrupt smooth boundary.

B2tca—1 inch to 9 inches; light reddish brown (5YR 6/4) gravelly clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; many very fine roots; common very fine tubular and interstitial pores; common moderately thick clay films lining pores and on faces of peds; 15 percent fine and medium pebbles and pan fragments; few lime veins and soft lime masses; strongly effervescent; moderately alkaline; clear wavy boundary.

Csicam—9 to 60 inches; pinkish white (7.5YR 8/2) and light brown (7.5YR 6/4), indurated, silica- and lime-cemented duripan; thin laminar layer on surface; massive; extremely hard, extremely firm; violently effervescent.

Depth to the duripan ranges from 5 to 20 inches. A thin A2 or B3ca horizon is in some pedons. Lime veins, concretions, or soft masses are in the B horizon. Generally, pan fragments are on the surface and throughout the profile.

The A horizon has hue of 10YR or 7.5YR, value of 5 to 7 when dry and 3 or 4 when moist, and chroma of 4 to 6. The A horizon is gravelly loam or very gravelly loam.

The B horizon has hue of 7.5YR or 5YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 3 to 6. It is gravelly clay loam, clay loam, or gravelly sandy clay loam. The B horizon averages less than 35 percent coarse fragments.

The Csicam horizon has several layers of softer material that are 1/2 inch to 3 inches thick and are between the indurated layers.

Suncity Variant

The Suncity Variant consists of very shallow and shallow, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 10 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy, mixed, thermic, shallow Typic Durargids.

Typical pedon of a Suncity Variant very gravelly sandy loam, in an area of Greyeagle-Suncity Variant complex, 1 to 7 percent slopes, about 2,600 feet south and 100 feet east of the northwest corner of sec. 11, T. 6 N., R. 3 E.

A1—0 to 2 inches; brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common fine interstitial pores; 38 percent pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

B2tca—2 to 9 inches; brown (7.5YR 5/4) gravelly clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine roots; common very fine tubular pores; few thin clay films on faces of peds and lining pores; 20 percent pebbles; violently effervescent; moderately alkaline; abrupt smooth boundary.

Csicam—9 to 60 inches; pinkish white (7.5YR 8/2) and pink (7.5YR 8/4), indurated, silica- and lime-cemented duripan; thin laminar layer on surface; massive; extremely hard, extremely firm; violently effervescent.

Depth to the duripan ranges from 5 to 20 inches. Some pedons have a thin A2 or B3ca horizon. Generally, pan fragments are on the surface and throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 or 4 when moist, and chroma of 4 or 6.

The B horizon has hue of 7.5YR or 5YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 3 to 6. It is gravelly clay loam, clay loam, gravelly loam, or gravelly sandy clay loam. The B horizon averages less than 35 percent coarse fragments.

The Csicam horizon has several layers of softer material that are 1/2 inch to 3 inches thick and are between the indurated layers.

Torriorthents

Torriorthents consist of deep, well drained soils on the sides of fan terraces and stream terraces. These soils formed in alluvium derived dominantly from lacustrine deposits, volcanic ash, and acid and basic igneous rock. Slope is 15 to 40 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

Reference pedon of Torriorthents in an area of Torriorthents, 15 to 40 percent slopes, about 800 feet north and 800 feet east of the southwest corner of sec. 12, T. 4 N., R. 6 E.

A1—0 to 6 inches; pink (7.5YR 8/4) gravelly loam, reddish yellow (7.5YR 6/6) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine interstitial pores; 20 percent pebbles; noneffervescent; mildly alkaline; abrupt smooth boundary.

IIC1—6 to 28 inches; pink (7.5YR 8/4) silty clay, reddish yellow (7.5YR 6/6) moist; massive; slightly hard, friable, very sticky and very plastic; many fine roots; few fine tubular pores; slightly effervescent; moderately alkaline; clear smooth boundary.

IIIC2—28 to 60 inches; light yellowish brown (10YR 6/4) clay, brownish yellow (10YR 6/6) moist; massive; extremely hard, firm, very sticky and very plastic; few fine roots; common fine tubular pores; noneffervescent; moderately alkaline.

Torriorthents are stratified. They are variable in color and are loamy sand to clay.

Tremant Series

The Tremant series consists of deep, well drained soils on fan terraces and stream terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 10 percent. Elevation is 1,100 to 2,200 feet. The average annual precipitation is about 2 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are fine-loamy, mixed, hyperthermic Typic Haplargids.

Typical pedon of a Tremant gravelly sandy loam, in an area of Tremant-Rillito complex, about 2,000 feet north and 500 feet west of the southeast corner of sec. 34, T. 4 N., R. 4 W.

A1—0 to 1 inch; light reddish brown (5YR 6/4) gravelly sandy loam, reddish brown (5YR 4/3) moist; weak thin platy structure; slightly hard, friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores and common very fine interstitial pores; 20 percent pebbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

B1—1 inch to 9 inches; light reddish brown (5YR 6/4) gravelly sandy loam, reddish brown (5YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many very fine roots; common very fine tubular and interstitial pores; 20 percent pebbles; noneffervescent; moderately alkaline; abrupt wavy boundary.

B21tca—9 to 20 inches; light reddish brown (5YR 6/4) gravelly sandy clay loam, reddish brown (5YR 5/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many very fine and few fine roots; common very fine tubular

pores and few very fine interstitial pores; few thin clay films on faces of peds and lining pores; 20 percent pebbles; many medium soft lime masses; violently effervescent; moderately alkaline; clear wavy boundary.

B22tca—20 to 41 inches; light reddish brown (5YR 6/4) gravelly sandy clay loam, reddish brown (5YR 5/4) moist; moderate medium subangular blocky structure; very hard, friable, very sticky and very plastic; common very fine and few fine roots; common very fine tubular and interstitial pores; 25 percent pebbles; few thin clay films on faces of peds and lining pores; many medium to large soft lime masses and few large lime concretions; violently effervescent; moderately alkaline; abrupt wavy boundary.

IICca—41 to 60 inches; light reddish brown (5YR 6/4) gravelly sand, reddish brown (5YR 5/4) moist; massive; soft, very friable; common very fine roots; many very fine interstitial pores; 34 percent pebbles; common fine soft lime masses; violently effervescent; moderately alkaline.

Depth to a calcic horizon is 5 to 24 inches. The control section averages 15 to 35 percent coarse fragments, mainly gravel. Some horizons have as much as 15 percent cobbles. The control section is gravelly sandy clay loam, gravelly loam, or gravelly clay loam.

The A horizon has hue of 5YR to 10YR, value of 5 to 7 when dry and 3 to 6 when moist, and chroma of 2 to 4. It is gravelly sandy loam, gravelly loam, or gravelly clay loam.

The A horizon and upper part of the B horizon are mildly alkaline or moderately alkaline.

The B horizon has hue of 5YR or 7.5YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 3 or 4.

The C horizon is gravelly sandy clay loam to gravelly or very gravelly sand. It is weakly cemented in some pedons.

Tres Hermanos Series

The Tres Hermanos series consists of deep, well drained soils on fan terraces and stream terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 10 percent. Elevation is 1,800 to 3,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are fine-loamy, mixed, thermic Typic Haplargids.

Typical pedon of a Tres Hermanos gravelly loam, in an area of Pinaleno-Tres Hermanos complex, low precipitation, 1 to 10 percent slopes, about 1,400 feet south and 2,500 feet east of the northwest corner of sec. 1, T. 6 N., R. 8 W.

A1—0 to 2 inches; reddish yellow (5YR 6/6) gravelly loam, yellowish red (5YR 4/6) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine vesicular pores; 23 percent medium pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

B1t—2 to 4 inches; reddish yellow (5YR 6/6) clay loam, yellowish red (5YR 4/6) moist; weak medium granular structure; soft, very friable, sticky and plastic; common very fine roots; common very fine interstitial pores; few thin clay films on faces of peds; 9 percent medium pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

B2t—4 to 10 inches; yellowish red (5YR 5/6) gravelly clay loam, yellowish red (5YR 4/6) moist; strong very fine and fine subangular blocky structure; hard, very friable, sticky and plastic; common very fine and few fine roots; common very fine tubular pores; many moderately thick clay films lining pores and on faces of peds; 15 percent fine pebbles; few lime filaments; violently effervescent; moderately alkaline; gradual wavy boundary.

B3tca—10 to 20 inches; yellowish red (5YR 5/6) and pink (5YR 7/4) very gravelly clay loam, yellowish red (5YR 4/6, 5/6) moist; moderate very fine and fine subangular blocky structure; hard, very friable, sticky and plastic; common very fine and few fine roots; common very fine tubular and interstitial pores; few moderately thick clay films lining pores and on faces of peds; 38 percent fine pebbles; many fine irregularly shaped lime concretions; violently effervescent; moderately alkaline; gradual wavy boundary.

IIC1ca—20 to 58 inches; white (5YR 8/1), weakly lime-cemented very gravelly loam, pinkish white (5YR 8/2) moist; massive; hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial pores; 40 percent fine and medium pebbles; common medium irregularly shaped soft lime masses; violently effervescent; moderately alkaline; gradual wavy boundary.

IIC2ca—58 to 60 inches; white (5YR 8/1) strongly lime-cemented very gravelly loam; massive; very hard, very firm; violently effervescent; moderately alkaline.

The control section averages 15 to 35 percent coarse fragments, mainly gravel. Some horizons have as much as 15 percent cobbles. The solum ranges from mildly alkaline to strongly alkaline.

The A horizon has hue of 5YR to 10YR, value of 5 to 7 when dry and 3 to 6 when moist, and chroma of 2 to 6. A thin A2 horizon is in some pedons. The A horizon is noneffervescent to strongly effervescent. It is gravelly loam or gravelly sandy loam.

The B2t horizon has hue of 5YR or 7.5YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 3 to 6. It is gravelly sandy clay loam, gravelly loam, gravelly clay loam, very gravelly clay loam, or clay loam.

The C horizon ranges from gravelly sandy clay loam or very gravelly loam to gravelly or very gravelly sand. Depth to the C horizon is 5 to 24 inches. The horizon is 15 to 60 percent calcium carbonate. It is slightly hard to very hard and is uncemented to strongly cemented.

Vado Series

The Vado series consists of deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 1 to 5 percent. Elevation is 1,800 to 2,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy-skeletal, mixed, thermic Typic Camborthids.

Typical pedon of Vado gravelly sandy loam, 1 to 5 percent slopes, about 1,600 feet west and 150 feet north of the southeast corner of sec. 26, T. 5 N., R. 6 E.

A1—0 to 2 inches; yellowish brown (10YR 5/4) gravelly sandy loam, strong brown (7.5YR 4/6) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 26 percent pebbles; noneffervescent; mildly alkaline; clear wavy boundary.

B2—2 to 28 inches; brown (7.5YR 5/4) very gravelly sandy loam, reddish brown (7.5YR 4/4) moist; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and few fine interstitial pores; 38 percent pebbles; noneffervescent; mildly alkaline; gradual wavy boundary.

C1—28 to 37 inches; strong brown (7.5YR 5/6) very gravelly sandy loam, strong brown (7.5YR 4/6) moist; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine interstitial pores; 38 percent pebbles; slightly effervescent; moderately alkaline; gradual wavy boundary.

C2ca—37 to 60 inches; brown (7.5YR 5/4) very gravelly sandy loam, reddish brown (7.5YR 4/4) moist; massive; very friable, nonsticky and nonplastic; few fine roots; few fine interstitial pores; 41 percent pebbles; strongly effervescent; moderately alkaline.

Thickness of the profile is more than 60 inches. Depth to carbonates is 20 inches or more. The profile generally is slightly effervescent or strongly effervescent. A buried, moderately coarse-textured to moderately fine-textured argillic horizon is below a depth of 40 inches in some pedons. The control section is more than 35 percent coarse fragments.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4 when moist, and chroma of 3 to 6.

The B and C horizons have hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 4 or 6. They are gravelly sandy loam, gravelly loam, very gravelly sandy loam, or very gravelly loamy sand.

Vaiva Series

The Vaiva series consists of very shallow and shallow, well drained soils on hill slopes and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from granite and gneiss. Slope is 1 to 25 percent. Elevation is 1,000 to 3,200 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are loamy-skeletal, mixed, hyperthermic Lithic Haplargids.

Typical pedon of Vaiva very gravelly loam, 1 to 20 percent slopes, about 1,300 feet south and 1,600 feet east of the northwest corner of sec. 22, T. 3 N., R. 4 W.

A1—0 to 1 inch; brown (7.5YR 5/4) very gravelly loam, reddish brown (5YR 4/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial pores; 50 percent pebbles and cobbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

B1t—1 inch to 3 inches; yellowish red (5YR 4/6) very gravelly loam, reddish brown (5YR 4/4) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial pores; few thin clay films on faces of peds; 55 percent pebbles; slightly effervescent in spots; moderately alkaline; gradual wavy boundary.

B2t—3 to 11 inches; red (2.5YR 4/6) very gravelly sandy clay loam, reddish brown (2.5YR 4/4) moist; common very fine and fine subangular blocky structure; hard, friable, sticky and plastic; common very fine, fine, and medium roots; few very fine tubular and interstitial pores; common moderately thick clay films lining pores and on faces of peds; 58 percent pebbles; noneffervescent; moderately alkaline; gradual wavy boundary.

IICrca—11 to 17 inches; red (2.5YR 4/6) highly fractured granite, reddish brown (2.5YR 4/4) moist; massive; hard, friable, sticky and plastic; few very fine and fine roots; few very fine tubular pores; common moderately thick clay films lining pores and coating rock fragments; 75 percent pebbles; few strongly effervescent calcium carbonate coatings in rock

fractures; moderately alkaline; abrupt smooth boundary.
IIR—17 inches; granite.

Depth to unweathered bedrock is less than 20 inches. The control section averages more than 35 percent coarse fragments. The profile is effervescent throughout in some pedons.

The A horizon has hue of 5YR to 10YR, value of 5 or 6 when dry and 4 when moist, and chroma of 3 or 4. This horizon is noneffervescent to strongly effervescent. It is very gravelly loam or extremely gravelly sandy loam.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5 when dry and 4 when moist, and chroma of 4 or 6. It is very gravelly loam, very gravelly sandy clay loam, or extremely gravelly sandy clay loam.

Valencia Series

The Valencia series consists of deep, well drained soils on alluvial fans. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,200 to 1,900 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents.

Typical pedon of a Valencia sandy loam that is calcareous throughout, in an area of Valencia sandy loams, about 1,300 feet west and 2,500 feet north of the southeast corner of sec. 27, T. 4 N., R. 4 W.

A1—0 to 1 inch; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; moderate thin platy structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; many very fine tubular pores; 10 percent fine pebbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.
C1—1 inch to 20 inches; light brown (7.5YR 6/4) sandy loam, strong brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine interstitial pores; slightly effervescent; moderately alkaline; clear wavy boundary.
IIB21tcab—20 to 42 inches; light reddish brown (5YR 6/4) sandy clay loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots and few fine and medium roots; few very fine tubular pores; few thin clay films lining pores; many lime filaments; 5 percent fine pebbles; violently effervescent; moderately alkaline; clear wavy boundary.
IIB22tcab—42 to 50 inches; reddish yellow (5YR 6/6) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and few medium roots; few very fine tubular pores and common very fine interstitial pores; common thin clay films on faces of peds and lining pores; many lime filaments; 17 percent fine and medium pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.
IIB23tcab—50 to 60 inches; reddish yellow (5YR 6/6) clay loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; extremely hard, firm, sticky and plastic; few very fine and fine roots; common very fine tubular and interstitial pores; common thin clay films on faces of peds and lining pores; many lime filaments; violently effervescent; moderately alkaline.

The A and C horizons are noneffervescent to violently effervescent to a depth of 10 inches and are slightly effervescent to violently effervescent below this depth. Lime is disseminated or is as filaments. The horizons are mildly alkaline or moderately alkaline. They have hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 3 to 6.

Depth to the buried IIBt horizon ranges from 20 to 39 inches. The buried IIB2 horizon is loam, sandy clay loam, clay loam, or gravelly sandy clay loam. It includes few to many segregated filaments or soft masses of lime.

Vint Series

The Vint series consists of deep, well drained soils on flood plains. These soils formed in alluvium derived dominantly from acid and basic igneous rock. Slope is 0 to 3 percent. Elevation is 1,100 to 1,600 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 70 to 73 degrees F, and the average frost-free season is 250 to 300 days.

These soils are sandy, mixed, hyperthermic Typic Torrifluvents.

Typical pedon of Vint loamy fine sand, about 2,700 feet south and 50 feet east of the northwest corner of sec. 19, T. 2 N., R. 6 E.

A1—0 to 1 inch; light brown (7.5YR 6/3) loamy fine sand, brown (7.5YR 4/3) moist; weak thin platy structure; slightly hard, very friable; common very fine roots; many very fine tubular pores and common fine vesicular pores; 3 percent pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.
C1—1 inch to 60 inches; light brown (7.5YR 6/3) loamy fine sand, brown (7.5YR 4/3) moist; single grain; loose; common medium and many fine roots; common very fine tubular and interstitial pores; 4 percent pebbles; strongly effervescent; moderately alkaline.

Very thin strata of fine sandy loam, sandy loam, very fine sandy loam, or sand are common in the control section. The profile is as much as 15 percent gravel. Few to common lime filaments are in the lower part of some pedons. Mica flakes are common.

The A and C horizons have hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 2 to 4. The C horizon is loamy sand or loamy fine sand.

Wickenburg Series

The Wickenburg series consists of shallow, well drained soils on pediments, hill slopes, and mountain slopes. These soils formed in alluvium and colluvium derived dominantly from granite. Slope is 1 to 65 percent. Elevation is 1,800 to 4,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 66 to 70 degrees F, and the average frost-free season is 220 to 270 days.

These soils are loamy-skeletal, mixed, thermic, shallow Typic Camborthids.

Typical pedon of a Wickenburg gravelly sandy loam, in an area of Gran-Wickenburg complex, low precipitation, 1 to 10 percent slopes, about 2,400 feet east and 2,100 feet south of the northwest corner of sec. 29, T. 7 N., R. 5 W.

A1—0 to 1 inch; light reddish brown (5YR 6/3) gravelly sandy loam, reddish brown (5YR 4/3) moist; weak thin platy structure; slightly hard, friable slightly sticky and slightly plastic; many very fine roots; common fine vesicular pores and many very fine tubular pores; 25 percent angular pebbles; noneffervescent; moderately alkaline; abrupt smooth boundary.

B2—1 inch to 12 inches; reddish brown (5YR 4/4) very gravelly sandy loam, dark reddish brown (5YR 3/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; common very fine and fine tubular pores; 35 percent coarse pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

Cr—12 to 60 inches; reddish brown (5YR 5/3) partially weathered granite; common very fine roots; few thin clay films coating bedrock and in fractures; few fine lime coatings in fractures.

Depth to weathered, fractured bedrock ranges from 10 to 20 inches, but is as little as 3 inches in some areas. Depth to relatively unweathered bedrock ranges from 40 to 60 inches or more. The profile is mildly alkaline or moderately alkaline.

Generally, the A horizon and upper part of the C horizon are noneffervescent and the lower part of the C horizon and the Cr horizon are slightly effervescent. Roots follow fractures to a depth of 6 feet or more. The A1 horizon has hue of 7.5YR or 5YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 2 to 4 when dry or moist. The C horizon has hue of 5YR or 7.5YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 2 to 4 when dry or moist.

Formation of the Soils

Soil is produced through the action of five factors of soil formation: (1)climate, (2) living organisms, (3) parent material, (4) relief, and (5) time. The kind of soil that forms is determined by the interaction of these factors. If the balance among these factors differs from one place to another, so do the soils.

The balance among the factors may remain the same for short or long periods of time. If the balance changes, the soil properties may change. In this survey area, the balance has shifted over geologic time and new soil characteristics have been superimposed on the old.

Soil formation occurs as two overlapping steps: (1) accumulation of parent material and (2) horizon differentiation. In this survey area, the soils formed mainly in residuum and alluvium weathered from rock.

The processes of weathering include mechanical disintegration, and chemical decomposition. The wide diurnal variation in temperature typical of a hot desert such as that in the survey area sets up expansive and contractive forces in rock, and disintegration results. Daily temperature variations of as much as 35 degrees F are common in the survey area. It is believed that the presence of coarse rock debris in some of the soils in the survey area is a result of temperature fluctuation. Chemical weathering occurs if moisture is available; annual rainfall averages less than 12 inches in this area, and chemical weathering is slow. Some moisture is present in the atmosphere at all times; however, even in this dry area, and over long periods of time, the formation of some soil material by chemical weathering is recognized. Most of the chemically weathered soil material in the area is the result of wetter climates that previously existed.

The mountains in this area are made up of a wide variety of rock formations. A distinctive characteristic of these mountains is the large areas composed of both very old rock (Precambrian) and relatively young rock (late Mesozoic and Cenozoic).

The geologic history of the survey area since Precambrian time has been dominated by persistent "positive area" rock masses. These masses are responsible for the complex internal structure of the mountain ranges. They consist of large areas of metamorphic rock such as schist, gneiss, quartzite, and similar rock and intrusive and extrusive igneous rock, especially acid igneous rock such as granite (*3*).

The feldspathic and calcium-bearing silicate minerals in these rocks strongly influence the properties of the soils that form from them. Feldspathic minerals produce clay as they weather. Rock that contains large amounts of feldspathic minerals generally produces soils that have an argillic (clayey) horizon. Soils derived from rock that contains calcium-bearing silicate minerals generally do not have an argillic horizon (*4*).

Four processes are involved in the development of soil horizons: accumulation, loss, transfer, and transformation. In this section the diagnostic properties and the major processes involved in the formation of a few of the soils in the survey area are discussed by landscape positions.

Soils on Mountains.—Precambrian granite is the most prominent type of rock in the eastern part of the survey area, especially in the vicinity of the McDowell Mountains. Gran soils (Typic Haplargids) typically formed in material that weathered from this rock (fig. 13). Gran soils contain a high percentage of clay and rock fragments and are shallow to bedrock. Precambrian granite contains a high percentage of clay-producing feldspar and is coarse grained. It weathers rapidly and directly influences the formation of argillic horizons. Erosion is severe because of the steepness of slope in this part of the survey area, and the soils are shallow. There are no carbonates associated with the soils in this part of the area.

Schenco soils (Typic Camborthids) typically form in material that weathered from schist. These soils are in the Hieroglyphic and Belmont Mountains. They contain a small percentage of clay, a high percentage of rock fragments, and a considerable amount of carbonates. The schist in these mountain areas characteristically is low in clay-producing minerals, but it is high in calcium-bearing minerals. Schenco soils do not have an argillic horizon. In some pedons there are horizons that have a redder hue than does the surface layer, but this is the result of in situ weathering of other secondary minerals.

A major mountain-building period began in the middle of the Cenozoic Era. Large amounts of various types of volcanic rock were formed during this period. Rock such as andesite formed during the Pliocene Epoch, one of the earlier stages of volcanism. The later stages of the Pleistocene Epoch were characterized by the extrusion of massive quantities of lava that became basalt (*3*).

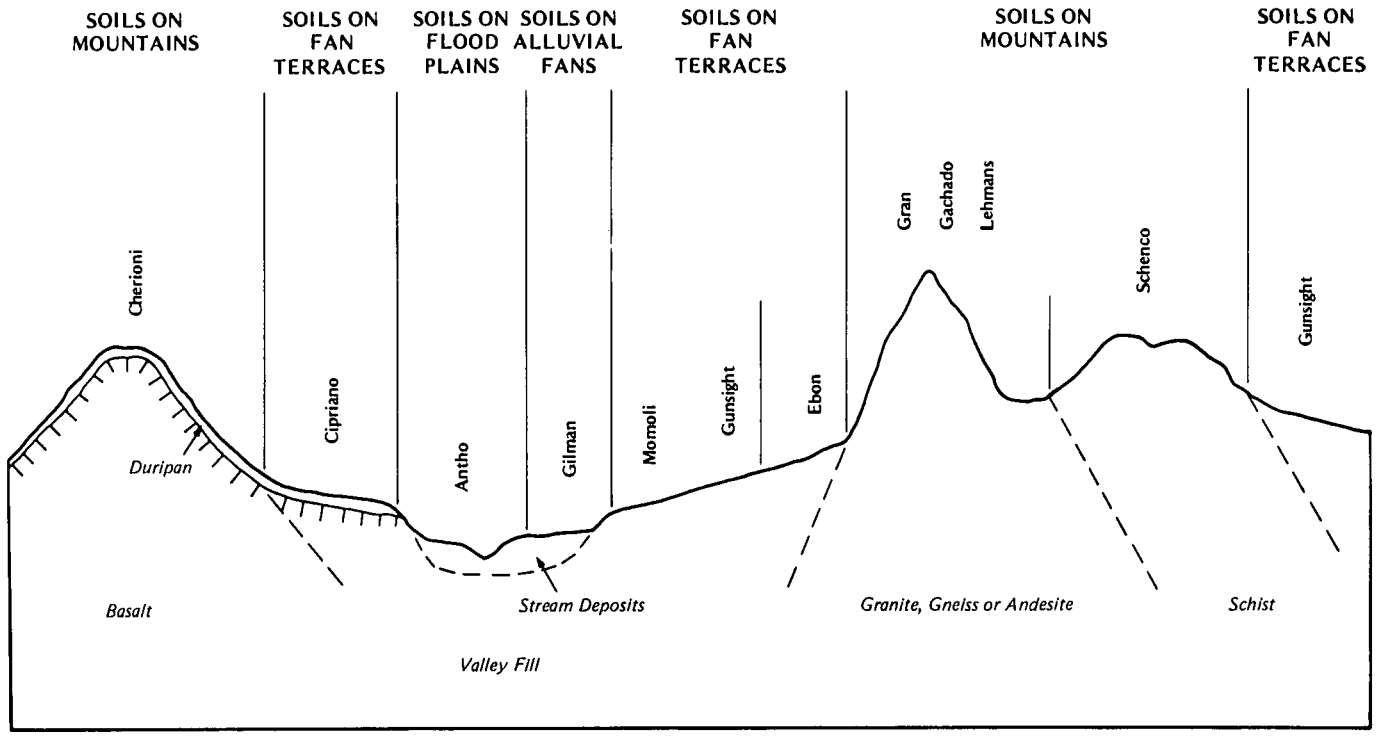

Figure 13.—Idealized soil-landscape profile.

Gachado and Lehmans soils (Lithic Haplargids) are typical soils that formed in material that weathered from andesite. They contain a high percentage of clay and are shallow to bedrock. The content of coarse fragments decreases and the percentage of clay increases as rainfall increases in different areas. This correlation is the result of the influence of climate on chemical weathering. The high content of clay-producing biotite and ferromagnesian minerals in andesite results in the formation of an argillic horizon. Erosion is severe in this part of the area because of the steepness of slope.

Cherioni soils (Typic Durorthids) are typical of soils that formed in material that weathered from basalt. Cherioni soils contain large amounts of carbonates and have a duripan overlying bedrock at a depth of less then 20 inches. It is believed that the duripan could have been formed by aeolian (windblown) addition of secondary carbonates over time and it was solidified by the addition of soluble silica (*5*). A proportional increase of silt in the surface layer generally accompanies the accumulation of windblown material. In the survey area, however, silt generally does not accumulate in the surface layer of the soils (*11*). It is also believed that a duripan forms as a result of weathering. Recent evidence from the northwestern states indicates that a duripan can be cemented with silica derived from volcanic ash.

In this survey area, soils that have a duripan are over, adjacent to, or downslope from basalt. Ash, fragmental material, and droplets of lava were expelled from volcanic vents and transported through the air during periods of magma extrusion. Rock such as tuff and volcanic breccia was formed in the immediate area of these vents. Ash deposits of varying thickness covered the entire area at this time. The ash was a ready and abundant source of soluble silica and carbonates. The formation of a duripan may be related to the amount of time these deposits were subjected to weathering processes. Even today, small deposits of ash can be observed in stable concave areas on granite mountaintops in the survey area.

Soils on Fan Terraces.—Fan terrace evolution, sedimentation, and pedogenesis in this survey area are generally associated with periods of abundant rainfall during the Pleistocene Epoch. It is debatable whether or not this climatic change occurred during midcontinental glaciation or interglaciation, but the morphology of Aridisols more than 100,000 years old proves the existence of previous climates that had more effective moisture than the present climate (*7*).

Fan terrace landforms are characterized by broad coalescent plains that have been incised by streams. The lithology of the mountains upslope from the fan terraces directly influences the properties and horizonation of the soils on these landforms. Typical soils on fan terraces are Ebon, Cipriano, Gunsight, and Momoli soils.

Ebon soils (Typic Haplargids) are at the proximal end of fan terraces near mountain fronts. They contain a high percentage of clay and a large amount of rock fragments, and they are deep. The parent material of these soils consists of clay-producing andesite, granite, or gneiss. If the parent material weathered from granite or gneiss, the soils contain few, if any, carbonates. If the parent material weathered from andesite, the soils contain some carbonates. The color of a horizon can be directly traced to the source of parent material if the sources haven't been mixed. Granite produces hues of 5YR or 2.5YR, and andesite produces hues of 10YR or 7.5YR.

Cipriano soils (Typic Durorthids) are also at the proximal end of fan terraces. They contain a small percentage of clay and a large amount of rock fragments and carbonates. They have a duripan at a depth of less than 20 inches. These soils are downslope from or adjacent to basalt mountains. Cipriano and Cherioni soils formed in the same type of parent material. They are both high in carbonates and have a duripan at a depth of less than 20 inches. Cherioni soils overlie basalt. Cipriano soils do not overlie basalt, but they formed in material that weathered from basalt.

Gunsight soils (Typic Calciorthids) have several feet of

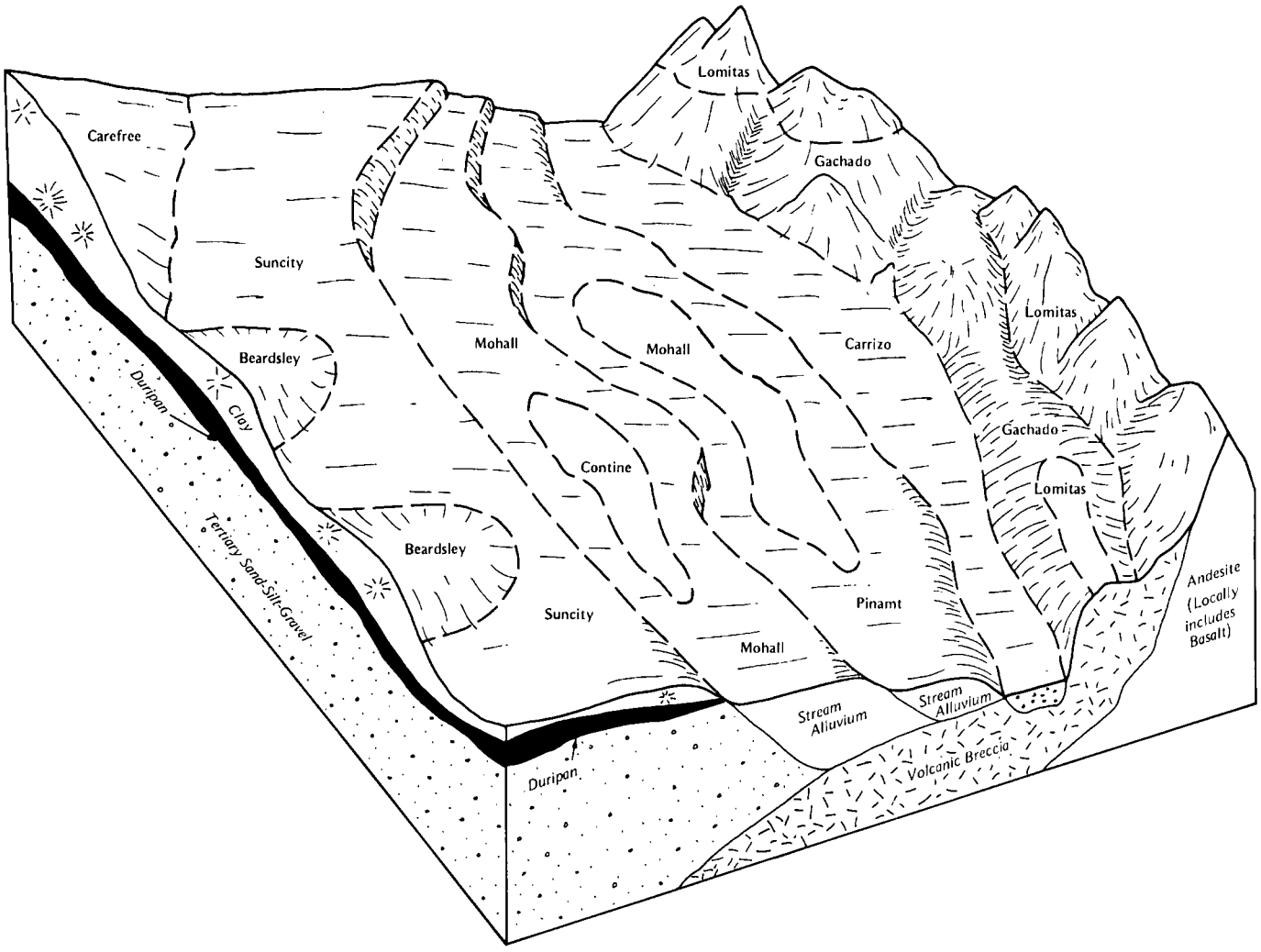

Figure 14.—Diagram of Agua Fria River-Lake Pleasant area.

white, high-carbonate ash at a shallow or moderate depth. These deposits reflect localized accumulations of ash. The presence of ash accumulations that have the same thickness in soils on geomorphic surfaces of various ages suggests that deposition occurred at the same time. Ash deposited on unstable mountain slopes mixed with the soil material and was transported and redeposited or superimposed over stable deposits on fan terraces.

Soils that formed on mountains after the ash deposits were removed are noncalcareous. Alluvium from these areas is also noncalcareous. Soils high in carbonates on fan terraces formed in alluvium from the period of volcanic ash deposition or in young alluvium derived from the old. Gunsight soils are older calcareous soils, and Momoli soils (Typic Camborthids) are younger calcareous soils on the distal end of fan terraces.

This pattern of calcareous soils, noncalcareous soils, and soils that have a duripan is predictable and observable throughout the survey area.

Soils on Alluvial Fans.—Each major change in the geomorphic equilibrium, whether induced by local tectonism or regional climatic fluctuation, causes new sediment to be carried toward the basins and away from the mountains. Consequently, older landforms are progressively abandoned as surfaces of transport and are dissected.

Alluvial fans are landforms that receive and accumulate sediment. Alluvial fans in the survey area formed during the Holocene Epoch and are a part of broad coalescent plains covered with alluvial material. These alluvial fans are characterized by numerous braided streams and shallow channels from which water periodically overflows and deposits alluvium on the surface. Considerable mixing occurs. Distinguishable horizons and a dominant parent material commonly are not present in these areas.

Gilman soils (Typic Torrifluvents) are on alluvial fans. These soils are medium textured, deep, and calcareous. They consist of water-transported alluvium that does not contain rock fragments. Rock fragments drop from suspension close to the mountains or in larger stream channels. Dominantly noncalcareous soil material eroded from mountains mixes with calcareous soil material eroded from fan terraces, and thus the soils on alluvial fans contain small amounts of carbonates.

Soils on Flood Plains.—The flood plains in the survey area formed during the Holocene Epoch and developed in alluvial material deposited by graded channels of the Hassayampa, Agua Fria, Verde, and Salt Rivers (fig. 14). Flood plains are characterized by low undulating bars and broad channels that are the result of periodic flooding. The soils in this survey area on flood plains include the Antho soils (Typic Torrifluvents) and Carrizo soils (Typic Torriorthents). These deep, calcareous, moderately coarse and coarse textured soils contain appreciable amounts of rock fragments. They have little or no horizon development. High velocity floodwaters carry and deposit rock fragments in these areas, but fine sediment is not deposited.

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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.

Amorphous material. A substance that does not have crystalline structure or has no definite external nature or character because of its irregular internal characteristics.

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.

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—

	Inches
Very low	0 to 3.5
Low	3.5 to 5.0
Moderate	5.0 to 7.5
High	More than 7.5

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

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

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

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

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

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

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channery fragment.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

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.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

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

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

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. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

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.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

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

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

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

Desert Pavement. A layer of gravel or coarser fragments on a desert soil surface that was emplaced by upward movement of fragments from underlying sediment or remains after finer particles have been removed by running water or 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 periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained. —Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

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.

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 the activities of man or other animals or of a catastrophe in nature; for example, fire that exposes the surface.

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

Fallow. Cropland left idle.

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 ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

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

Foot slope. The inclined surface at the base of a hill.

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

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.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

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 (geology). Water filling all the unblocked pores of underlying 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.

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.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well-defined outline; hill slopes generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case 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 at the surface of a mineral soil.
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.

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. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

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 A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C .

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

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.

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.

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

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—

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.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

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.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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

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

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

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

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, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and 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.

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and considerable bare-rock surface. 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 the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

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.

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.

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

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 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 thickness.

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.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Positive area. A large structural feature or portion of the Earth's crust characterized through a long period of geologic time by relative stability or subsidence that is considerably less than those of adjacent elements.

Potential plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and t he site is properly managed. (See climax plant community.)

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.

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 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.

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. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

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

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

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

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

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.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

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.

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

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

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.

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. In this survey the following slope classes are recognized:

	Percent
Nearly level	0 to 3
Gently sloping	1 to 8
Strongly sloping	5 to 16
Moderately steep	10 to 30
Steep	20 to 65
Very steep	45 to more than 65

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

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

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 of separates recognized in the United States are as follows:

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

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

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 6 to 15 inches (15 to 38 centimeters) in length if flat.

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

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

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

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

Substratum. The part of the soil below the solum.

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."

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.

Tectonism. The process of deformation that produces in the Earth's crust its continents and ocean basins, plateaus and mountains, folds of strata, and faults.

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 is generally built so that the field can be farmed.

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 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.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

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

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

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

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

Valley fill. Alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

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

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

changes result in disintegration and decomposition of the material.

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

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.1 inch or more	Average snowfall
	Recorded in the period 1951-78 at Buckeye, Ariz.										
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	67.2	34.9	51.1	81	20	99	.73	.04	1.23	2	.0
February---	72.6	38.8	55.7	87	24	195	.68	.06	1.15	2	.0
March------	77.4	42.8	60.1	95	28	325	.70	.02	1.20	2	.0
April------	85.9	48.3	67.1	100	35	513	.23	---	.35	1	.0
May--------	95.2	56.5	75.8	110	41	800	.05	---	.05	0	.0
June-------	104.8	65.0	84.9	117	50	1,047	.08	---	.12	0	.0
July-------	108.2	75.5	91.9	117	61	1,299	.62	.06	1.04	2	.0
August-----	105.6	73.7	89.6	116	59	1,228	1.25	.18	2.04	3	.0
September--	100.9	65.6	83.3	112	50	999	.74	---	1.26	1	.0
October----	90.5	53.4	72.0	104	37	682	.64	---	1.12	2	.0
November---	76.6	42.2	59.5	91	27	289	.52	---	.90	2	.0
December---	67.9	35.1	51.5	81	20	100	.78	---	1.32	2	.0
Yearly:											
Average--	87.7	52.7	70.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	118	19	---	---	---	---	---	---
Total----	---	---	---	---	---	7,576	7.02	4.45	8.79	19	.0

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.1 inch or more	Average snowfall
Recorded in the period 1951-78 at Wickenburg, Ariz.											
	°F	°F	°F	°F	°F	Units	In	In	In		In
January---	64.0	30.8	47.4	80	17	45	.94	.09	1.55	2	.0
February--	68.1	33.9	51.0	86	20	121	.95	.06	1.62	2	.0
March-----	72.5	37.8	55.2	91	25	218	1.26	.06	2.14	3	.1
April-----	81.2	43.7	62.5	97	32	375	.45	---	.77	1	.0
May-------	90.8	51.1	71.0	106	37	651	.21	---	.34	1	.0
June------	100.9	59.9	80.5	115	46	915	.21	---	.37	1	.0
July------	105.0	70.2	87.6	115	56	1,166	1.29	.34	2.05	3	.0
August----	101.8	68.3	85.0	113	54	1,085	1.99	.59	3.12	4	.0
September-	96.9	59.8	78.3	109	45	849	1.19	---	2.06	2	.0
October---	86.4	48.2	67.3	100	33	536	.65	.04	1.09	2	.0
November--	73.4	37.4	55.4	88	24	180	.78	.05	1.32	2	.0
December--	65.0	31.1	48.2	80	19	62	1.19	.10	2.01	3	.1
Yearly----											
Average-	83.8	47.7	65.8	---	---	---	---	---	---	---	---
Extreme-	---	---	---	115	16	---	---	---	---	---	---
Total---	---	---	---	---	---	6,203	11.11	7.30	14.92	26	.2

[1]A growing degree day is an index of the amount of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Recorded in the period 1951-78 at Buckeye, Ariz.			
Last freezing temperature in spring:			
1 year in 10 later than--	February 15	March 8	March 23
2 years in 10 later than--	February 4	February 26	March 1
5 years in 10 later than--	January 11	February 6	March 1
First freezing temperature in fall:			
1 year in 10 earlier than--	November 25	November 14	November 6
2 years in 10 earlier than--	December 5	November 22	November 13
5 years in 10 earlier than--	December 25	December 8	November 27
Recorded in the period 1951-78 at Wickenburg, Ariz.			
Last freezing temperature in spring:			
1 year in 10 later than--	March 12	March 25	April 15
2 years in 10 later than--	March 1	March 17	April 8
5 years in 10 later than--	February 6	February 28	March 24
First freezing temperature in fall:			
1 year in 10 earlier than--	November 14	November 11	November 1
2 years in 10 earlier than--	November 24	November 18	November 6
5 years in 10 earlier than--	December 15	November 30	November 16

TABLE 3.--GROWING SEASON

Probability	Length of growing season if daily minimum temperature exceeds--		
	24° F	28° F	32° F
Recorded in the period 1951-78 at Buckeye, Ariz.			
	Days	Days	Days
9 years in 10	299	262	243
8 years in 10	313	277	252
5 years in 10	349	307	270
2 years in 10	365	348	288
1 year in 10	365	365	297
Recorded in the period 1951-78 at Wickenburg, Ariz.			
	Days	Days	Days
9 years in 10	266	247	208
8 years in 10	283	256	217
5 years in 10	316	275	236
2 years in 10	362	293	255
1 year in 10	365	302	265

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Maricopa County	Pinal County	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
1	Antho sandy loams	7,430	0	7,430	0.4
2	Antho gravelly sandy loams	4,850	0	4,850	0.2
3	Antho-Carrizo-Maripo complex	16,510	840	17,350	1.1
4	Antho-Carrizo-Maripo complex, low precipitation	4,390	0	4,390	0.3
5	Anthony sandy loam	2,890	0	2,890	0.2
6	Anthony-Arizo complex	5,670	0	5,670	0.3
7	Anthony-Arizo complex, low precipitation	5,560	0	5,560	0.3
8	Arizo cobbly sandy loam	4,830	0	4,830	0.3
9	Beeline-Cipriano complex, 3 to 45 percent slopes	9,720	0	9,720	0.6
10	Brios-Carrizo complex, 1 to 5 percent slopes	12,645	405	13,050	0.8
11	Brios-Carrizo complex, low precipitation, 1 to 5 percent slopes	13,070	0	13,070	0.8
12	Carefree cobbly clay loam, 1 to 8 percent slopes	18,605	1,985	20,590	1.3
13	Carefree-Beardsley complex	22,286	490	22,776	1.4
14	Carrizo very gravelly sand	2,950	0	2,950	0.2
15	Carrizo-Gunsight complex, 1 to 5 percent slopes	9,020	0	9,020	0.6
16	Cellar-Rock outcrop complex, 10 to 70 percent slopes	19,210	0	19,210	1.2
17	Cellar-Rock outcrop complex, low precipitation, 10 to 70 percent slopes	11,350	0	11,350	0.7
18	Cherioni-Rock outcrop complex, 5 to 60 percent slopes	10,650	0	10,650	0.7
19	Chuckawalla-Gunsight complex, 1 to 8 percent slopes	5,390	0	5,390	0.3
20	Chuckawalla-Gunsight complex, low precipitation, 1 to 8 percent slopes	32,520	0	32,520	2.0
21	Cipriano very gravelly loam	7,120	0	7,120	0.4
22	Contine clay loam	17,700	350	18,050	1.1
23	Contine clay	3,630	0	3,630	0.2
24	Continental clay loam, 0 to 3 percent slopes	10,000	0	10,000	0.6
25	Continental clay, 0 to 3 percent slopes	6,680	0	6,680	0.4
26	Continental cobbly clay loam, 1 to 8 percent slopes	3,940	0	3,940	0.2
27	Continental-Mohave complex, 1 to 7 percent slopes	10,120	0	10,120	0.6
28	Continental-Ohaco complex	2,340	0	2,340	0.1
29	Denure-Momoli-Carrizo complex	9,360	0	9,360	0.6
30	Denure-Momoli-Carrizo complex, low precipitation	32,370	0	32,370	2.0
31	Dixaleta-Rock outcrop complex, 25 to 65 percent slopes	34,150	0	34,150	2.2
32	Dixaleta-Rock outcrop complex, low precipitation, 25 to 65 percent slopes	2,870	0	2,870	0.2
33	Eba very gravelly loam, 1 to 8 percent slopes	29,398	0	29,398	1.8
34	Eba very gravelly loam, 8 to 20 percent slopes	6,650	0	6,650	0.4
35	Eba very gravelly loam, low precipitation, 8 to 20 percent slopes	2,180	0	2,180	0.1
36	Eba-Continental complex, 1 to 8 percent slopes	8,540	0	8,540	0.5
37	Eba-Continental-Cave association, 3 to 20 percent slopes	5,350	0	5,350	0.3
38	Eba-Continental-Cave association, low precipitation, 3 to 20 percent slopes	8,900	0	8,900	0.6
39	Eba-Nickel-Cave association, 3 to 25 percent slopes	7,880	0	7,880	0.5
40	Eba-Pinaleno complex, 3 to 20 percent slopes	11,550	0	11,550	0.7
41	Eba-Pinaleno complex, 20 to 40 percent slopes	18,480	0	18,480	1.1
42	Eba-Pinaleno complex, low precipitation, 3 to 20 percent slopes	7,000	0	7,000	0.4
43	Eba-Pinaleno complex, low precipitation, 20 to 40 percent slopes	4,490	0	4,490	0.3
44	Ebon very gravelly loam, 1 to 8 percent slopes	21,455	4,385	25,840	1.6
45	Ebon very gravelly loam, 8 to 20 percent slopes	9,435	885	10,320	0.6
46	Ebon-Contine complex, 1 to 8 percent	5,490	0	5,490	0.3
47	Ebon-Gunsight-Cipriano association, 3 to 25 percent slopes	12,990	0	12,990	0.8
48	Ebon-Pinamt complex, 3 to 20 percent slopes	20,224	1,116	21,340	1.3
49	Ebon-Pinamt complex, 20 to 40 percent slopes	7,980	220	8,200	0.5
50	Estrella loams	8,880	0	8,880	0.6
51	Gachado-Lomitas complex, 8 to 25 percent slopes	24,490	0	24,490	1.5
52	Gachado-Lomitas-Rock outcrop complex, 7 to 55 percent slopes	76,540	1,500	78,040	4.8
53	Gadsden clay	9,920	0	9,920	0.6
54	Gila fine sandy loams	3,720	0	3,720	0.2
55	Gilman loams	37,700	0	37,700	2.3
56	Gilman loams, low precipitation	6,070	0	6,070	0.4
57	Gilman clay loam	770	0	770	*
58	Gilman-Momoli-Denure complex	10,620	0	10,620	0.7
59	Gilman-Momoli-Denure complex, low precipitation	7,640	0	7,640	0.5
60	Glenbar loams	4,170	0	4,170	0.3
61	Gran-Wickenburg complex, 1 to 10 percent slopes	31,395	305	31,700	2.0

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Maricopa County	Pinal County	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
62	Gran-Wickenburg complex, low precipitation, 1 to 10 percent slopes	11,410	0	11,410	0.7
63	Gran-Wickenburg-Rock outcrop complex, 10 to 65 percent slopes	21,175	905	22,080	1.4
64	Gran-Wickenburg-Rock outcrop complex, low precipitation, 10 to 65 percent slopes	33,070	0	33,070	2.0
65	Greyeagle-Continental-Nickel association, 1 to 40 percent slopes	34,180	0	34,180	2.1
66	Greyeagle-Suncity Variant complex, 1 to 7 percent slopes	5,280	0	5,280	0.3
67	Guest clay	11,780	0	11,780	0.7
68	Gunsight-Cipriano complex, 1 to 7 percent slopes	9,865	515	10,380	0.6
69	Gunsight-Cipriano complex, low precipitation, 1 to 7 percent slopes	14,090	0	14,090	0.9
70	Gunsight-Rillito complex, 1 to 25 percent slopes	13,690	0	13,690	0.8
71	Gunsight-Rillito complex, low precipitation, 1 to 40 percent slopes	34,010	0	34,010	2.1
72	Lehmans-Rock outcrop complex, 8 to 65 percent slopes	36,610	0	36,610	2.2
73	Lehmans-Rock outcrop complex, low precipitation, 8 to 65 percent slopes	40,050	0	40,050	2.5
74	Luke-Cipriano association, 1 to 15 percent slopes	6,450	0	6,450	0.4
75	Mohall loam	11,545	55	11,600	0.7
76	Mohall loam, calcareous solum	5,720	0	5,720	0.4
77	Mohall clay loam	13,400	230	13,630	0.8
78	Mohall clay loam, calcareous solum	4,710	1,390	6,100	0.4
79	Mohall clay	2,077	0	2,077	0.1
80	Mohall-Tremant complex, 1 to 8 percent slopes	3,000	0	3,000	0.2
81	Mohall-Tremant complex, low precipitation, 1 to 8 percent slopes	2,930	0	2,930	0.2
82	Mohave sandy loam	4,640	0	4,640	0.3
83	Mohave loam	5,490	0	5,490	0.3
84	Mohave loam, calcareous solum	8,390	0	8,390	0.5
85	Mohave clay loam	12,960	0	12,960	0.8
86	Mohave clay loam, calcareous solum	4,410	0	4,410	0.3
87	Mohave complex	4,460	0	4,460	0.3
88	Mohave-Guest complex	19,340	0	19,340	1.2
89	Mohave-Tres Hermanos complex, 1 to 8 percent slopes	4,220	0	4,220	0.3
90	Momoli gravelly sandy loam, 1 to 5 percent slopes	20,680	0	20,680	1.3
91	Momoli-Carrizo complex	27,100	0	27,100	1.7
92	Momoli-Carrizo complex, low precipitation	16,470	0	16,470	1.0
93	Nickel-Cave complex, 8 to 30 percent slopes	6,340	0	6,340	0.4
94	Nickel-Cave complex, low precipitation, 8 to 30 percent slopes	4,120	0	4,120	0.2
95	Ohaco gravelly loam	2,536	0	2,536	0.2
96	Pinaleno-Tres Hermanos complex, 1 to 10 percent slopes	15,960	0	15,960	1.0
97	Pinaleno-Tres Hermanos complex, low precipitation, 1 to 10 percent slopes	4,060	0	4,060	0.3
98	Pinamt-Tremant complex, 1 to 10 percent slopes	41,981	9,494	51,475	3.2
99	Pinamt-Tremant complex, low precipitation, 1 to 10 percent slopes	3,970	0	3,970	0.2
100	Quilotosa-Vaiva-Rock outcrop complex, 20 to 65 percent slopes	64,681	0	64,681	4.0
101	Rillito loam, 0 to 3 percent slopes	2,150	0	2,150	0.1
102	Rillito gravelly loam, 1 to 8 percent slopes	13,650	0	13,650	0.8
103	Rock outcrop-Gachado complex, 5 to 55 percent slopes	7,670	0	7,670	0.5
104	Rock outcrop-Lehmans complex, 15 to 65 percent slopes	15,060	0	15,060	0.9
105	Rock outcrop-Lehmans complex, low precipitation, 15 to 65 percent slopes	4,202	0	4,202	0.3
106	Sal-Cipriano complex, 1 to 10 percent slopes	12,120	0	12,120	0.7
107	Sal-Cipriano complex, low precipitation, 1 to 10 percent slopes	9,730	0	9,730	0.6
108	Schenco-Rock outcrop complex, 3 to 25 percent slopes	3,210	0	3,210	0.2
109	Schenco-Rock outcrop complex, 25 to 60 percent slopes	20,400	0	20,400	1.3
110	Suncity-Cipriano complex, 1 to 7 percent slopes	25,435	55	25,490	1.5
111	Torriorthents, 15 to 40 percent slopes	2,800	0	2,800	0.2
112	Tremant gravelly sandy loams	23,700	0	23,700	1.5
113	Tremant gravelly loams	21,465	0	21,465	1.3
114	Tremant gravelly loams, low precipitation	2,840	0	2,840	0.2
115	Tremant-Antho complex, 1 to 5 percent slopes	9,280	765	10,045	0.6
116	Tremant-Gunsight-Rillito complex, 1 to 5 percent slopes	6,405	850	7,255	0.4

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Maricopa County	Pinal County	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
117	Tremant-Gunsight-Rillito complex, low precipitation, 1 to 5 percent slopes	18,630	0	18,630	1.1
118	Tremant-Rillito complex	3,950	10	3,960	0.2
119	Tremant-Suncity complex, 1 to 8 percent slopes	6,260	0	6,260	0.4
120	Tres Hermanos gravelly sandy loams	8,420	0	8,420	0.5
121	Tres Hermanos-Anthony complex, 1 to 5 percent slopes	3,800	0	3,800	0.2
122	Vado gravelly sandy loam, 1 to 5 percent slopes	5,960	0	5,960	0.4
123	Vaiva very gravelly loam, 1 to 20 percent slopes	13,120	0	13,120	0.8
124	Valencia sandy loams	2,020	0	2,020	0.1
125	Vint loamy fine sand	4,110	0	4,110	0.3
	Total	1,602,370	26,750	1,629,120	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF IRRIGATED CROPS AND PASTURE

[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. Only the soils suited to crops and pasture are listed]

Soil name and map symbol	Cotton lint	Wheat	Barley	Grain sorghum	Alfalfa hay	Safflower
	Lbs	Tons	Tons	Tons	Tons	Tons
1, 2---------- Antho-Antho	1,300	---	1.8	2.5	8.5	---
5---------- Anthony	1,350	2.5	2.5	2.5	9.0	1.4
22, 23---------- Contine	1,500	3.0	3.0	3.0	10.0	1.8
24, 25---------- Continental	1,375	3.0	3.0	3.0	9.0	1.6
54---------- Gila-Gila	1,440	2.7	2.5	3.5	10.0	1.6
55, 56---------- Gilman-Gilman	1,600	3.0	3.0	3.5	12.0	1.8
57---------- Gilman	1,600	3.0	3.0	3.5	12.0	1.8
60---------- Glenbar-Glenbar	1,600	3.0	3.0	3.0	12.0	1.8
67---------- Guest	1,375	3.0	3.0	3.0	9.0	1.6
75, 76, 77, 78---------- Mohall	1,500	3.0	3.0	2.5	10.0	1.8
79---------- Mohall	1,500	3.0	3.0	2.5	9.0	1.6
82, 83, 84, 85, 86-------- Mohave	1,440	2.7	2.5	2.5	9.0	1.6
101---------- Rillito	1,375	2.5	2.5	2.0	9.0	1.4
112, 113, 114---------- Tremant-Tremant	1,375	2.0	2.0	2.0	8.0	1.5

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
1*:					
Antho-Noncalcareous	Sandy Loam Upland, 7-10" P.z.	Favorable	800	Big galleta	30
		Normal	600	Bush muhly	15
		Unfavorable	400	Creosotebush	15
				White bursage	5
				White ratany	5
				Littleleaf paloverde	5
				Ironwood	5
				Other annual grasses	10
				Other annual forbs	10
Antho-Calcareous	Limy Fan, 7-10" P.z.	Favorable	600	Creosotebush	30
		Normal	300	Bush muhly	10
		Unfavorable	200	Triangle bursage	10
				Big galleta	5
				White ratany	5
				Other annual forbs	20
				Other annual grasses	15
				Other perennial forbs	5
2*:					
Antho-Noncalcareous	Sandy Loam Upland, 7-10" P.z.	Favorable	800	Big galleta	30
		Normal	600	Bush muhly	15
		Unfavorable	400	Creosotebush	15
				White bursage	5
				White ratany	5
				Littleleaf paloverde	5
				Buckhorn cholla	5
				Other annual grasses	10
				Other annual forbs	10
Antho-Calcareous	Limy Fan, 7-10" P.z.	Favorable	600	Creosotebush	30
		Normal	300	Bush muhly	10
		Unfavorable	200	Triangle bursage	10
				Big galleta	5
				White ratany	5
				Other annual forbs	20
				Other annual grasses	15
				Other perennial forbs	5
3*:					
Antho	Sandy Loam Upland, 7-10" P.z.	Favorable	800	Big galleta	30
		Normal	600	Bush muhly	15
		Unfavorable	400	Creosotebush	15
				White bursage	5
				White ratany	5
				Littleleaf paloverde	5
				Ironwood	5
				Other annual grasses	10
				Other annual forbs	10
Carrizo	Sandy Bottom, 7-10" P.z.	Favorable	1,600	Littleleaf paloverde	10
		Normal	1,200	Blue paloverde	10
		Unfavorable	800	Bush muhly	5
				Big galleta	5
				Ironwood	5
				Catclaw acacia	5
				Wolfberry	5
				Creosotebush	5
				Other shrubs	20
				Other perennial forbs	10
				Other annual grasses	10
				Other perennial grasses	5
				Other annual forbs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
3*:					
Maripo	Sandy Loam Upland, 7-10" P.z.	Favorable	650	Big galleta	20
		Normal	400	Triangle bursage	10
		Unfavorable	300	White ratany	10
				Creosotebush	10
				Bush muhly	10
				Littleleaf paloverde	5
				Burrowbush	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	5
				Other shrubs	5
4*:					
Antho	Sandy Loam Upland, 2-7" P.z.	Favorable	500	White bursage	15
		Normal	300	Big galleta	10
		Unfavorable	200	Creosotebush	10
				White ratany	10
				Bush muhly	5
				Littleleaf paloverde	5
				Ironwood	5
				Buckhorn cholla	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial forbs	5
				Other shrubs	5
Carrizo	Sandy Bottom, 2-7" P.z.	Favorable	1,500	Littleleaf paloverde	15
		Normal	1,000	Ironwood	10
		Unfavorable	600	Wolfberry	10
				Creosotebush	10
				Bush muhly	5
				Big galleta	5
				Catclaw acacia	5
				Other shrubs	10
				Other annual grasses	10
				Other annual forbs	10
				Other perennial grasses	5
				Other perennial forbs	5
Maripo	Sandy Loam Upland, 2-7" P.z.	Favorable	500	White bursage	25
		Normal	300	Big galleta	25
		Unfavorable	200	Creosotebush	10
				White ratany	5
				Littleleaf paloverde	5
				Burrowbush	5
				Other annual forbs	10
				Other annual grasses	10
				Other shrubs	5
5---------- Anthony	Sandy Loam Upland, 8-10" P.z.	Favorable	500	Big galleta	35
		Normal	400	White bursage	15
		Unfavorable	300	Bush muhly	10
				Rothrock grama	5
				Arizona cottontop	5
				Threeawn	5
				Dropseed	5
				White ratany	5
				Fourwing saltbush	5
				Other shrubs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
6*:					
Anthony	Sandy Loam Upland, 10-12" P.z.	Favorable	650	Bush muhly	40
		Normal	500	Rothrock grama	20
		Unfavorable	450	Arizona cottontop	5
				Threeawn	5
				Dropseed	5
				Soaptree yucca	5
				White ratany	5
				Fourwing saltbush	5
				Other shrubs	10
Arizo	Sandy Bottom, 10-12" P.z.	Favorable	2,500	Bush muhly	10
		Normal	1,800	Paloverde	10
		Unfavorable	700	Creosotebush	5
				Desertwillow	5
				Catclaw	5
				Ambrosia bursage	5
				Wolfberry	5
				Other perennial grasses	15
				Other perennial forbs	10
				Other annual forbs	10
				Other annual grasses	5
7*:					
Anthony	Sandy Loam Upland, 8-10" P.z.	Favorable	500	Big galleta	35
		Normal	400	White bursage	15
		Unfavorable	300	Bush muhly	10
				Rothrock grama	5
				Arizona cottontop	5
				Threeawn	5
				Dropseed	5
				White ratany	5
				Fourwing saltbush	5
				Other shrubs	10
Arizo	Sandy Bottom, 8-10" P.z.	Favorable	2,000	Bush muhly	15
		Normal	1,500	Big galleta	15
		Unfavorable	500	Paloverde	10
				Creosotebush	5
				Desertwillow	5
				Catclaw	5
				Wolfberry	5
				Burrowbush	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	10
				Other perennial grasses	5
8 Arizo	Sandy Bottom, 10-12" P.z.	Favorable	2,500	Bush muhly	10
		Normal	1,800	Blue paloverde	10
		Unfavorable	700	Creosotebush	5
				Desert willow	5
				Catclaw acacia	5
				Canyon ragweed	5
				Desert thorn	5
				Burrowbush	5
				Other perennial grasses	15
				Other annual forbs	10
				Other perennial forbs	10
				Other shrubs	10
				Other annual grasses	5
9*:					
Beeline	Limy Upland, 7-10" P.z.	Favorable	200	Creosotebush	40
		Normal	100	Triangle bursage	5
		Unfavorable	50	Littleleaf paloverde	5
				Cactus	5
				Other annual forbs	10
				Other perennial grasses	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
9*:					
Cipriano	Limy Upland, 7-10" P.z.	Favorable	250	White bursage	10
		Normal	175	Triangle bursage	10
		Unfavorable	100	Bush muhly	5
				Creosotebush	5
				White ratany	5
				Ocotillo	5
				Other annual forbs	45
				Other perennial forbs	5
				Other annual grasses	5
				Other shrubs	5
10*:					
Brios	Sandy Bottom, 7-10" P.z.	Favorable	2,500	Big galleta	15
		Normal	1,500	Blue paloverde	15
		Unfavorable	500	Bush muhly	10
				Littleleaf paloverde	10
				Ironwood	10
				Catclaw acacia	5
				Desertthorn	5
				Longleaf mormon-tea	5
				Other perennial forbs	10
				Other annual forbs	10
				Other annual grasses	5
Carrizo	Sandy Bottom, 7-10" P.z.	Favorable	1,600	Littleleaf paloverde	10
		Normal	1,200	Blue paloverde	10
		Unfavorable	800	Bush muhly	5
				Big galleta	5
				Ironwood	5
				Catclaw acacia	5
				Wolfberry	5
				Creosotebush	5
				Other shrubs	20
				Other perennial forbs	10
				Other annual grasses	10
				Other perennial grasses	5
				Other annual forbs	5
11*:					
Brios	Sandy Bottom, 2-7" P.z.	Favorable	1,600	Big galleta	20
		Normal	1,200	Littleleaf paloverde	15
		Unfavorable	800	Bush muhly	5
				Blue paloverde	5
				Ironwood	5
				Catclaw acacia	5
				Longleaf mormon-tea	5
				Threeawn	5
				Burrowbush	5
				Fourwing saltbush	5
				Desert saltbush	5
				Other perennial forbs	10
				Other annual forbs	5
				Other annual grasses	5
Carrizo	Sandy Bottom, 1-7" P.z.	Favorable	1,500	Littleleaf paloverde	15
		Normal	1,000	Ironwood	10
		Unfavorable	600	Wolfberry	10
				Creosotebush	10
				Bush muhly	5
				Big galleta	5
				Catclaw acacia	5
				Other annual grasses	10
				Other annual forbs	10
				Other shrubs	10
				Other perennial grasses	5
				Other perennial forbs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
12---------- Carefree	Clayey Upland, 7-10 P.z.------	Favorable	800	Tobosa----------	60
		Normal	600	Threeawn----------	5
		Unfavorable	400	Triangle bursage----------	5
				Blue paloverde----------	5
				Big galleta----------	5
				Cactus----------	5
				Other annual grasses----------	5
				Other perennial forbs----------	5
				Other annual forbs----------	5
13*:					
Carefree----------	Clayey Upland, 7-10" P.z.-----	Favorable	800	Tobosa----------	60
		Normal	600	Threeawn----------	5
		Unfavorable	400	Triangle bursage----------	5
				Blue paloverde----------	5
				Big galleta----------	5
				Cactus----------	5
				Other annual grasses----------	5
				Other perennial forbs----------	5
				Other annual forbs----------	5
Beardsley---------	Clayey Upland, 7-10" P.z.-----	Favorable	450	Tobosa----------	35
		Normal	300	Triangle bursage----------	25
		Unfavorable	200	Buckhorn cholla----------	10
				Creosotebush----------	5
				Desertthorn----------	5
				Other annual forbs----------	10
				Other annual grasses----------	5
				Other shrubs----------	5
14---------- Carrizo	Sandy Upland, 2-7" P.z.-------	Favorable	450	Triangle bursage----------	20
		Normal	275	Littleleaf paloverde----------	5
		Unfavorable	150	Big galleta----------	5
				Bush muhly----------	5
				Threeawn----------	5
				Creosotebush----------	5
				White ratany----------	5
				Ironwood----------	5
				Desertthorn----------	5
				Burrowbush----------	5
				Other annual grasses----------	10
				Other annual forbs----------	10
				Other perennial forbs----------	5
				Other shrubs----------	5
15*:					
Carrizo----------	Sandy Loam Upland, 1-7" P.z.	Favorable	500	White bursage----------	15
		Normal	300	Big galleta----------	10
		Unfavorable	200	Creosotebush----------	10
				White ratany----------	10
				Bush muhly----------	5
				Littleleaf paloverde----------	5
				Ironwood----------	5
				Buckhorn cholla----------	5
				Other annual forbs----------	15
				Other annual grasses----------	10
				Other shrubs----------	5
				Other perennial forbs----------	5
Gunsight----------	Limy Upland, 2-7" P.z.--------	Favorable	200	Creosotebush----------	70
		Normal	100	Bush muhly----------	5
		Unfavorable	50	Triangle bursage----------	5
				White bursage----------	5
				White ratany----------	5
				Other annual forbs----------	5
				Other shrubs----------	5

See footnote at and of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
16*:					
Cellar	Granitic Hills, 10-12" P.z.	Favorable	800	Bush muhly	15
		Normal	700	Arizona cottontop	10
		Unfavorable	500	Slim tridens	10
				Flattop buckwheat	10
				Shrubby deervetch	5
				Desert globemallow	5
				Littleleaf paloverde	5
				False-mesquite	5
				Range ratany	5
				Mormon-tea	5
				Sideoats grama	5
				Jojoba	5
				Other perennial grasses	10
				Other shrubs	5
Rock outcrop.					
17*:					
Cellar	Granitic Hills, 8-10" P.z.	Favorable	700	Big galleta	20
		Normal	600	Bush muhly	10
		Unfavorable	400	Slim tridens	10
				Flattop buckwheat	10
				Arizona cottontop	5
				Shrubby deervetch	5
				Desert globemallow	5
				Littleleaf paloverde	5
				False-mesquite	5
				Range ratany	5
				Mormon-tea	5
				Other shrubs	15
Rock outcrop.					
18*:					
Cherioni	Basalt Hills, 7-10" P.z.	Favorable	700	Triangle bursage	25
		Normal	450	White brittlebush	20
		Unfavorable	300	Creosotebush	10
				Littleleaf paloverde	10
				Ironwood	10
				Cactus	10
				Ocotillo	5
				Other annual grasses	5
Rock outcrop.					
19*:					
Chuckawalla	Saline Upland (Loamy), 7-10" P.z.	Favorable	20	Annual forbs	99
		Normal	10		
		Unfavorable	0		
Gunsight	Limy Upland, 7-10" P.z.	Favorable	250	Creosotebush	45
		Normal	150	Triangle bursage	15
		Unfavorable	100	White bursage	10
				Bush muhly	5
				Threeawn	5
				White ratany	5
				Other shrubs	5
				Other annual forbs	5
				Other perennial forbs	5
20*:					
Chuckawalla	Saline Upland (Loamy), 2-7" P.z.	Favorable	10	Annual forbs	99
		Normal	5		
		Unfavorable	0		

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
20*:					
Gunsight	Limy Upland, 2-7" P.z.	Favorable	200	Creosotebush	70
		Normal	100	Bush muhly	5
		Unfavorable	50	Triangle bursage	5
				White bursage	5
				White ratany	5
				Other shrubs	5
				Other annual forbs	5
21	Limy Upland 7-10" P.z.	Favorable	250	White bursage	10
Cipriano		Normal	175	Triangle bursage	10
		Unfavorable	100	Bush muhly	5
				Creosotebush	5
				White ratany	5
				Ocotillo	5
				Other annual forbs	45
				Other perennial forbs	5
				Other annual grasses	5
				Other shrubs	5
22	Clay Loam Upland, 7-10" P.z.	Favorable	600	Tobosa	25
Contine		Normal	400	Bush muhly	20
		Unfavorable	250	Threeawn	10
				Big galleta	5
				Arizona cottontop	5
				Plains bristlegrass	5
				Desertthorn	5
				Cactus	5
				Other perennial forbs	10
				Other annual forbs	10
23	Clayey Upland, 7-10" P.z.	Favorable	550	Tobosa	65
Contine		Normal	400	Big galleta	5
		Unfavorable	200	Desertthorn	10
				Cactus	5
				Other perennial forbs	10
				Other annual forbs	5
				Other annual grasses	5
24	Clay Loam Upland, 8-10" P.z.	Favorable	850	Tobosa	25
Continental		Normal	650	Big galleta	20
		Unfavorable	450	Threeawn	10
				Bush muhly	10
				Other shrubs	15
				Other perennial forbs	10
				Other annual forbs	10
25	Clayey Upland, 8-10" P.z.	Favorable	800	Tobosa	80
Continental		Normal	600	Threeawn	5
		Unfavorable	400	Other annual forbs	10
				Other perennial forbs	5
26	Clayey Upland, 10-12" P.z.	Favorable	1,000	Tobosa	75
Continental		Normal	750	Threeawn	5
		Unfavorable	500	Other shrubs	10
				Other perennial forbs	5
				Other annual forbs	5
27*:					
Continental	Clay Loam Upland, 8-10" P.z.	Favorable	850	Tobosa	25
		Normal	650	Big galleta	20
		Unfavorable	450	Threeawn	10
				Bush muhly	10
				Other shrubs	15
				Other perennial forbs	10
				Other annual forbs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
27*:					
Mohave	Loamy Upland, 8-10" P.z.	Favorable	800	Big galleta	30
		Normal	600	Bush muhly	20
		Unfavorable	400	Arizona cottontop	10
				Threeawn	5
				Desert globemallow	5
				Range ratany	5
				Mormon-tea	5
				White bursage	5
				Other shrubs	10
				Other annual forbs	5
28*:					
Continental	Clayey Upland, 10-12" P.z.	Favorable	1,000	Tobosa	75
		Normal	750	Threeawn	5
		Unfavorable	500	Other shrubs	10
				Other perennial forbs	5
				Other annual forbs	5
Ohaco	Clayey Upland, 10-12" P.z.	Favorable	700	Tobosa	55
		Normal	550	Creosotebush	5
		Unfavorable	400	Other annual grasses	10
				Other annual forbs	10
				Other perennial grasses	5
				Other perennial forbs	5
				Other shrubs	5
29*:					
Denure	Sandy Loam Upland, 7-10" P.z.	Favorable	600	Big galleta	10
		Normal	400	Bush muhly	10
		Unfavorable	300	Creosotebush	10
				White ratany	10
				Triangle bursage	10
				Littleleaf paloverde	5
				Ironwood	5
				Buckhorn cholla	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	10
				Other shrubs	5
Momoli	Sandy Loam upland, 7-10" P.z.	Favorable	500	Triangle bursage	15
		Normal	400	Big galleta	10
		Unfavorable	300	Bush muhly	10
				Creosotebush	10
				White ratany	10
				Littleleaf paloverde	10
				Other perennial forbs	10
				Other annual forbs	10
				Other annual grasses	10
				Other shrubs	5
Carrizo	Sandy Loam Upland, 7-10" P.z.	Favorable	600	Big galleta	10
		Normal	375	Threeawn	10
		Unfavorable	300	White ratany	10
				Littleleaf paloverde	10
				Bush muhly	5
				Creosotebush	5
				White bursage	5
				Ironwood	5
				Desertthorn	5
				Burrowbush	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
30*:					
Denure	Sandy Loam Upland, 2-7" P.z.	Favorable	500	White bursage	15
		Normal	300	Big galleta	10
		Unfavorable	200	Creosotebush	10
				White ratany	10
				Bush muhly	5
				Littleleaf paloverde	5
				Ironwood	5
				Buckhorn cholla	5
				Other annual forbs	15
				Other annual grasses	10
				Other shrubs	5
				Other perennial forbs	5
Momoli	Sandy Loam Upland, 2-7" P.z.	Favorable	400	Creosotebush	15
		Normal	300	White bursage	15
		Unfavorable	200	Big galleta	10
				White ratany	10
				Bush muhly	5
				Littleleaf paloverde	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial forbs	10
				Other shrubs	5
Carrizo	Sandy Loam Upland, 2-7" P.z.	Favorable	450	Triangle bursage	20
		Normal	275	Littleaf paloverde	10
		Unfavorable	150	Big galleta	5
				Bush muhly	5
				Threeawn	5
				Creosotebush	5
				White ratany	5
				Ironwood	5
				Desertthorn	5
				Burrowbush	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	5
				Other shrubs	5
31*:					
Dixaleta	Schist Hills, 10-12" P.z.	Favorable	800	Flattop buckwheat	15
		Normal	600	Desert needlegrass	10
		Unfavorable	400	Bush muhly	10
				Threeawn	10
				Jojoba	10
				White brittlebush	5
				Triangle bursage	5
				Ocotillo	5
				Cactus	5
				Other shrubs	15
				Other perennial grasses	5
				Other perennial forbs	5
Rock outcrop.					

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
32*:					
Dixaleta	Schist Hills, 8-10" P.z.	Favorable	600	Flattop buckwheat	20
		Normal	500	Desert needlegrass	15
		Unfavorable	400	Bush muhly	10
				Threeawn	5
				Littleleaf paloverde	5
				White brittlebush	5
				Ocotillo	5
				Cactus	5
				Other shrubs	10
				Other perennial grasses	5
				Other annual grasses	5
				Other perennial forbs	5
				Other annual forbs	5
Rock outcrop.					
33	Clay Loam Upland, 10-12" P.z.	Favorable	800	Bush muhly	30
Eba		Normal	600	Threeawn	15
		Unfavorable	450	Tobosa	10
				Triangle bursage	10
				Curlymesquite	5
				False-mesquite	5
				Buckhorn cholla	5
				Other shrubs	10
				Other annual forbs	5
				Other annual grasses	5
34	Clay Loam Upland, 10-12" P.z.	Favorable	800	Bush muhly	30
Eba		Normal	600	Threeawn	15
		Unfavorable	450	Tobosa	10
				Triangle bursage	10
				Curlymesquite	5
				False-mesquite	5
				Buckhorn cholla	5
				Other shrubs	10
				Other annual forbs	5
				Other annual grasses	5
35	Clay Loam Upland, 8-10" P.z.	Favorable	700	Big galleta	20
Eba		Normal	500	Threeawn	15
		Unfavorable	400	Tobosa	10
				Bush muhly	5
				Buckhorn cholla	5
				Other shrubs	15
				Other perennial grasses	10
				Other annual forbs	10
				Other annual grasses	10
36*:					
Eba	Clay Loam Upland, 8-10" P.z.	Favorable	700	Big galleta	20
		Normal	500	Threeawn	15
		Unfavorable	400	Tobosa	10
				Bush muhly	5
				Buckhorn cholla	5
				Other shrubs	15
				Other perennial grasses	10
				Other annual forbs	10
				Other annual grasses	10
Continental	Clay Loam Upland, 8-10" P.z.	Favorable	850	Tobosa	25
		Normal	650	Big galleta	20
		Unfavorable	450	Threeawn	10
				Bush muhly	10
				Other shrubs	15
				Other perennial forbs	10
				Other annual forbs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
37*:					
Eba	Clay Loam Upland, 10-12" P.z.	Favorable	800	Bush muhly	30
		Normal	600	Threeawn	15
		Unfavorable	450	Tobosa	10
				Triangle bursage	10
				Curlymesquite	5
				False-mesquite	5
				Buckhorn cholla	5
				Other shrubs	10
				Other annual forbs	5
				Other annual grasses	5
Continental	Clay Loam Upland, 10-12" P.z.	Favorable	1,100	Tobosa	35
		Normal	800	Bush muhly	25
		Unfavorable	600	Threeawn	15
				Other shrubs	10
				Other perennial forbs	10
				Other annual forbs	5
Cave	Limy Upland, 10-12" P.z.	Favorable	500	Bush muhly	30
		Normal	300	Creosotebush	20
		Unfavorable	150	Whitestem paperflower	10
				Slim tridens	5
				Desert zinnia	5
				Coldenia	5
				Whitethorn	5
				Fluffgrass	5
				Range ratany	5
				Other perennial grasses	10
38*:					
Eba	Clay Loam Upland, 8-10" P.z.	Favorable	700	Big galleta	20
		Normal	500	Threeawn	15
		Unfavorable	400	Tobosa	10
				Bush muhly	5
				Buckhorn cholla	5
				Other shrubs	15
				Other perennial grasses	10
				Other annual grasses	10
				Other annual forbs	10
Continental	Clay Loam Upland, 8-10" P.z.	Favorable	850	Tobosa	25
		Normal	650	Big galleta	20
		Unfavorable	450	Threeawn	10
				Bush muhly	10
				Other shrubs	15
				Other annual forbs	10
Cave	Limy Upland, 8-10" P.z.	Favorable	400	Bush muhly	30
		Normal	250	Creosotebush	25
		Unfavorable	100	Whitethorn	10
				Slim tridens	5
				Coldenia	5
				Fluffgrass	5
				White bursage	5
				Range ratany	5
				Whitestem paperflower	5
				Other perennial grasses	5
39*:					
Eba	Clay Loam Upland, 8-10" P.z.	Favorable	700	Big galleta	20
		Normal	600	Threeawn	15
		Unfavorable	400	Tobosa	10
				Bush muhly	5
				Buckhorn cholla	5
				Other shrubs	15
				Other perennial grasses	10
				Other annual grasses	10
				Other annual forbs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
39*:					
Nickel	Limy Slopes, 8-10" P.z.	Favorable	500	Creosotebush	35
		Normal	400	White bursage	15
		Unfavorable	300	Bush muhly	10
				Big galleta	10
				Red grama	5
				Slim tridens	5
				Fluffgrass	5
				Ephedra	5
				Coldenia	5
				Range ratany	5
Cave	Limy Upland, 8-10" P.z.	Favorable	500	Bush muhly	30
		Normal	300	Creosotebush	20
		Unfavorable	150	Whitestem paperflower	10
				Slim tridens	5
				Desert zinnia	5
				Coldenia	5
				Whitethorn	5
				Fluffgrass	5
				Range ratany	5
40*:					
Eba	Clay Loam Upland, 10-12" P.z.	Favorable	800	Bush muhly	30
		Normal	600	Threeawn	15
		Unfavorable	450	Tobosa	10
				Triangle bursage	10
				Curlymesquite	5
				False-mesquite	5
				Buckhorn cholla	5
				Other annual grasses	5
				Other annual forbs	5
Pinaleno	Loamy Upland, 10-12" P.z.	Favorable	800	Bush muhly	15
		Normal	500	Threeawn	15
		Unfavorable	375	Black grama	10
				Creosotebush	10
				Ocotillo	5
				Desert zinnia	5
				Mariola	5
				Slim tridens	5
				Fluffgrass	5
				Whitestem paperflower	5
				Other perennial grasses	10
				Other annual forbs	5
				Other shrubs	5
41*:					
Eba	Loamy Hills, 10-12" P.z.	Favorable	900	Bush muhly	20
		Normal	700	Curlymesquite	20
		Unfavorable	500	Tobosa	15
				False-mesquite	10
				Threeawn	5
				Triangle bursage	5
				Littleleaf paloverde	5
				Buckhorn cholla	5
				Other shrubs	10
				Other perennial grasses	5
Pinaleno	Loamy Hills, 10-12" P.z.	Favorable	900	Bush muhly	20
		Normal	600	Threeawn	10
		Unfavorable	450	Slim tridens	10
				Black grama	5
				Ocotillo	5
				Creosotebush	5
				Whitestem paperflower	5
				Other shrubs	30
				Other perennial grasses	5
				Other annual forbs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
42*:					
Eba	Clay Loam Upland, 8-10" P.z.	Favorable	700	Big galleta	20
		Normal	500	Threeawn	15
		Unfavorable	400	Tobosa	10
				Bush muhly	5
				Buckhorn cholla	5
				Other shrubs	15
				Other perennial grasses	10
				Other annual grasses	10
				Other annual forbs	10
Pinaleno	Loamy Upland, 8-10" P.z.	Favorable	600	Bush muhly	20
		Normal	400	Big galleta	20
		Unfavorable	300	Threeawn	10
				Whitestem paperflower	10
43*:					
Eba	Loamy Hills, 8-10" P.z.	Favorable	800	Tobosa	30
		Normal	600	Big galleta	15
		Unfavorable	450	Bush muhly	10
				Curlymesquite	5
				Threeawn	5
				False-mesquite	5
				Littleleaf paloverde	5
				Buckhorn cholla	5
				Desert globemallow	5
				Other annual forbs	5
				Other shrubs	5
Pinaleno	Loamy Hills, 8-10" P.z.	Favorable	700	Big galleta	35
		Normal	500	Bush muhly	10
		Unfavorable	400	Threeawn	10
				Ocotillo	5
				Whitestem paperflower	5
				Other shrubs	20
				Other perennial grasses	10
				Other annual forbs	5
44, 45 Ebon	Clay Loam Upland, 7-10" P.z.	Favorable	600	Triangle bursage	20
		Normal	400	Bush muhly	10
		Unfavorable	300	Tobosa	10
				Buckhorn cholla	10
				Threeawn	5
				Littleleaf paloverde	5
				Ironwood	5
				Other annual grasses	15
				Other annual forbs	15
				Other shrubs	5
46*:					
Ebon	Clay Loam Upland, 7-10" P.z.	Favorable	600	Triangle bursage	20
		Normal	400	Bush muhly	10
		Unfavorable	300	Tobosa	10
				Buckhorn cholla	10
				Threeawn	5
				Littleleaf paloverde	5
				Ironwood	5
				Other annual grasses	15
				Other annual forbs	15
				Other shrubs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
46*:					
Contine	Clay Loam Upland, 7-10" P.z.	Favorable	600	Tobosa	25
		Normal	400	Bush muhly	20
		Unfavorable	250	Threeawn	10
				Big galleta	5
				Arizona cottontop	5
				Plains bristlegrass	5
				Desertthorn	5
				Cactus	5
				Other perennial grasses	10
				Other perennial forbs	10
47*:					
Ebon	Clay Loam Upland, 7-10" P.z.	Favorable	600	Triangle bursage	20
		Normal	400	Bush muhly	10
		Unfavorable	300	Tobosa	10
				Buckhorn cholla	10
				Threeawn	5
				Littleleaf paloverde	5
				Ironwood	5
				Other annual grasses	15
				Other annual forbs	15
				Other shrubs	5
Gunsight	Limy Upland, 7-10" P.z.	Favorable	250	Creosotebush	45
		Normal	150	Triangle bursage	15
		Unfavorable	100	White bursage	10
				Bush muhly	5
				Threeawn	5
				White ratany	5
				Other annual forbs	5
				Other perennial forbs	5
Cipriano	Limy Upland, 7-10" P.z.	Favorable	250	White bursage	10
		Normal	175	Triangle bursage	10
		Unfavorable	100	Bush muhly	5
				Creosotebush	5
				White ratany	5
				Ocotillo	5
				Other annual forbs	45
				Other shrubs	5
				Other annual grasses	5
				Other perennial forbs	5
48*:					
Ebon	Clay Loam Upland, 7-10" P.z.	Favorable	600	Triangle bursage	20
		Normal	400	Bush muhly	10
		Unfavorable	300	Tobosa	10
				Buckhorn cholla	10
				Threeawn	5
				Littleleaf paloverde	5
				Ironwood	5
				Other annual grasses	15
				Other annual forbs	15
				Other shrubs	5
Pinamt	Loamy Upland, 7-10" P.z.	Favorable	500	Triangle bursage	20
		Normal	400	Cactus	10
		Unfavorable	300	Threeawn	10
				Bush muhly	10
				Creosotebush	5
				White ratany	5
				Big galleta	5
				Littleleaf paloverde	5
				Other annual forbs	15
				Other annual grasses	10
				Other shrubs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
49*:					
Ebon	Loamy Hills, 7-10" P.z.	Favorable	650	Bush muhly	15
		Normal	500	Triangle bursage	15
		Unfavorable	350	Littleleaf paloverde	10
				Buckhorn cholla	10
				Big galleta	5
				Tobosa	5
				Threeawn	5
				Ironwood	5
				White brittlebush	5
				Saguaro	5
				Other annual forbs	10
				Other annual grasses	5
				Other shrubs	5
Pinamt	Loamy Hills, 7-10" P.z.	Favorable	600	Triangle bursage	15
		Normal	450	Threeawn	15
		Unfavorable	350	Cactus	10
				Bush muhly	10
				Creosotebush	5
				White ratany	5
				Big galleta	5
				Littleleaf paloverde	5
				Ironwood	5
				White brittlebush	5
				Other annual forbs	10
				Other annual grasses	5
				Other shrubs	5
50*:					
Estrella Calcareous	Limy Fan, 7-10" P.z.	Favorable	550	Creosotebush	25
		Normal	375	Big galleta	10
		Unfavorable	250	White bursage	10
				White ratany	10
				Desert globemallow	5
				Triangle bursage	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial grasses	5
				Other perennial forbs	5
Estrella Noncalcareous	Loamy Upland, 7-10" P.z.	Favorable	600	Big galleta	25
		Normal	450	Bush muhly	10
		Unfavorable	350	Desert globemallow	10
				Creosotebush	10
				White bursage	10
				Triangle bursage	5
				White ratany	5
				Other annual forbs	10
				Other annual grasses	5
				Other perennial grasses	5
				Other perennial forbs	5
51*:					
Gachado	Volcanic Hills, 7-10" P.z.	Favorable	600	Littleleaf paloverde	10
		Normal	500	Buckhorn cholla	10
		Unfavorable	400	Desert globemallow	10
				Bush muhly	10
				Triangle bursage	5
				White brittlebush	5
				White ratany	5
				Ocotillo	5
				Big galleta	5
				Other shrubs	10
				Other perennial grasses	5
				Other annual grasses	5
				Other annual forbs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
51*:					
Lomitas	Limy Hills, 7-10" P.z.	Favorable	400	Creosotebush	20
		Normal	300	Triangle bursage	15
		Unfavorable	200	Littleleaf paloverde	10
				White brittlebush	10
				Cactus	10
				Bush muhly	5
				Ironwood	5
				White ratany	5
				Other perennial grasses	5
				Other annual grasses	5
				Other annual forbs	5
				Other shrubs	5
52*:					
Gachado	Volcanic Hills, 7-10" P.z.	Favorable	600	Littleleaf paloverde	10
		Normal	500	Buckhorn cholla	10
		Unfavorable	400	Desert globemallow	10
				Bush muhly	10
				Triangle bursage	5
				White brittlebush	5
				White ratany	5
				Ocotillo	5
				Big galleta	5
				Other shrubs	10
				Other perennial grasses	5
				Other annual grasses	5
				Other annual forbs	5
Lomitas	Volcanic Hills, 7-10" P.z.	Favorable	450	Bush muhly	10
		Normal	350	Littleleaf paloverde	10
		Unfavorable	250	Ironwood	5
				Shrubby buckwheat	5
				Triangle bursage	5
				White brittlebush	5
				Cactus	5
				Other shrubs	20
				Other perennial grasses	15
				Other perennial forbs	10
				Other annual grasses	5
				Other annual forbs	5
Rock outcrop.					
53---------- Gadsden	Clayey Bottom, 7-10" P.z.	Favorable	1,100	Tobosa	65
		Normal	850	Vine-mesquite	5
		Unfavorable	600	Cactus	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	5
54*:					
Gila Noncalcareous	Sandy Loam Upland, 8-10" P.z.	Favorable	800	Big galleta	25
		Normal	600	Bush muhly	15
		Unfavorable	400	Threeawn	10
				White bursage	10
				Other annual grasses	10
				Other annual forbs	10
				Other shrubs	10
				Creosotebush	5
				Other perennial forbs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
54*:					
Gila	Limy Fan, 8-10" P.z.	Favorable	800	Creosotebush	30
Calcareous		Normal	500	White bursage	10
		Unfavorable	350	Big galleta	5
				Bush muhly	5
				Threeawn	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial forbs	10
				Other shrubs	10
55*:					
Gilman	Loamy Upland, 7-10" P.z.	Favorable	600	Threeawn	20
Noncalcareous		Normal	450	Big galleta	15
		Unfavorable	350	Bush muhly	10
				Creosotebush	5
				Triangle bursage	5
				Other perennial forbs	15
				Other annual grasses	15
				Other annual forbs	10
				Other shrubs	5
Gilman	Limy Fan, 7-10" P.z.	Favorable	550	Creosotebush	35
Calcareous		Normal	350	Triangle bursage	10
		Unfavorable	250	White ratany	10
				Big galleta	5
				Bush muhly	5
				Littleleaf paloverde	5
				Other annual forbs	15
				Other annual grasses	10
				Other shrubs	5
56*:					
Gilman	Loamy Upland, 2-7" P.z.	Favorable	550	Big galleta	30
Noncalcareous		Normal	350	White bursage	15
		Unfavorable	250	Bush muhly	5
				Threeawn	5
				Creosotebush	5
				Other annual grasses	15
				Other perennial forbs	10
				Other annual forbs	10
				Other shrubs	5
Gilman	Limy Fan, 2-7" P.z.	Favorable	400	Creosotebush	50
Calcareous		Normal	250	White bursage	10
		Unfavorable	150	Big galleta	5
				Bush muhly	5
				White ratany	5
				Other annual forbs	15
				Other annual grasses	10
58*:					
Gilman	Loamy Upland, 7-10" P.z.	Favorable	600	Threeawn	20
		Normal	450	Big galleta	15
		Unfavorable	350	Bush muhly	10
				Creosotebush	5
				Triangle bursage	5
				Other perennial forbs	15
				Other annual grasses	15
				Other annual forbs	10
				Other shrubs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
58*:					
Momoli	Sandy Loam Upland, 7-10" P.z.	Favorable	500	Triangle bursage	15
		Normal	400	Big galleta	10
		Unfavorable	300	Bush muhly	10
				Creosotebush	10
				White ratany	10
				Littleleaf paloverde	10
				Other annual grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other shrubs	5
Denure	Sandy Loam Upland, 7-10" P.z.	Favorable	600	Big galleta	10
		Normal	400	Bush muhly	10
		Unfavorable	300	Creosotebush	10
				White ratany	10
				Triangle bursage	10
				Littleleaf paloverde	5
				Ironwood	5
				Buckhorn cholla	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	10
				Other shrubs	5
59*:					
Gilman	Limy Fan, 2-7" P.z.	Favorable	400	Creosotebush	50
		Normal	250	White bursage	10
		Unfavorable	150	Big galleta	5
				Bush muhly	5
				White ratany	5
				Other annual forbs	15
				Other annual grasses	10
Momoli	Limy Fan, 2-7" P.z.	Favorable	400	Creosotebush	50
		Normal	250	White bursage	10
		Unfavorable	150	Big galleta	5
				Bush muhly	5
				White ratany	5
				Other annual forbs	15
				Other annual grasses	10
Denure	Limy Fan, 2-7" P.z.	Favorable	400	Creosotebush	45
		Normal	300	White bursage	10
		Unfavorable	200	Big galleta	5
				Bush muhly	5
				White ratany	5
				Other annual forbs	15
				Other annual grasses	10
				Other shrubs	5
60*:					
Glenbar Noncalcareous	Loamy Upland, 7-10" P.z.	Favorable	600	Tobosa	25
		Normal	450	Threeawn	15
		Unfavorable	350	Desertthorn	5
				Triangle bursage	5
				Creosotebush	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial forbs	10
				Other perennial grasses	5
				Other shrubs	5
Glenbar Calcareous	Limy Fan, 7-10" P.z.	Favorable	550	Creosotebush	30
		Normal	400	Threeawn	15
		Unfavorable	200	Big galleta	5
				Bush muhly	5
				Other annual grasses	10
				Other annual forbs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
61*:					
Gran	Shallow Upland, 10-12" P.z.	Favorable	500	Bush muhly	20
		Normal	375	Littleleaf paloverde	15
		Unfavorable	250	Threeawn	10
				False-mesquite	5
				Jojoba	5
				Arizona cottontop	5
				Other shrubs	15
Wickenburg	Shallow Upland, 10-12" P.z.	Favorable	500	Bush muhly	25
		Normal	375	Littleleaf paloverde	10
		Unfavorable	250	False-mesquite	10
				Jojoba	10
				Arizona cottontop	5
				Shrubby deervetch	5
				Desert globemallow	5
				Flattop buckwheat	5
				Range ratany	5
				Mormon-tea	5
				Other shrubs	10
				Other perennial grasses	5
62*:					
Gran	Shallow Upland, 8-10" P.z.	Favorable	500	Big galleta	15
		Normal	350	Bush muhly	15
		Unfavorable	250	Threeawn	5
				Littleleaf paloverde	5
				False-mesquite	5
				Arizona cottontop	5
				Other shrubs	25
Wickenburg	Shallow Upland, 8-10" P.z.	Favorable	450	Big galleta	30
		Normal	350	Bush muhly	15
		Unfavorable	250	Flattop buckwheat	10
				Arizona cottontop	5
				Shrubby deervetch	5
				Desert globemallow	5
				False-mesquite	5
				Range ratany	5
				Mormon-tea	5
				Other shrubs	15
63*:					
Gran	Granitic Hills, 10-12" P.z.	Favorable	800	Bush muhly	15
		Normal	650	Arizona cottontop	10
		Unfavorable	400	Curlymesquite	10
				Tobosa	5
				Threeawn	5
				Littleleaf paloverde	5
				False-mesquite	5
				Jojoba	5
				Other shrubs	15
Wickenburg	Granitic Hills, 10-12" P.z.	Favorable	800	Bush muhly	15
		Normal	700	Arizona cottontop	10
		Unfavorable	500	Slim tridens	10
				Flattop buckwheat	10
				Sideoats grama	5
				Shrubby deervetch	5
				Desert globemallow	5
				Littleleaf paloverde	5
				False-mesquite	5
				Jojoba	5
				Range ratany	5
				Mormon-tea	5
				Other shrubs	5
Rock outcrop.					

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
64*:					
Gran	Granitic Hills, 8-10" P.z.	Favorable	700	Big galleta	15
		Normal	550	Tobosa	15
		Unfavorable	350	Bush muhly	10
				Curlymesquite	5
				Threeawn	5
				False-mesquite	5
				Arizona cottontop	5
				Other shrubs	15
Wickenburg	Granitic Hills, 8-10" P.z.	Favorable	700	Big galleta	30
		Normal	550	Bush muhly	15
		Unfavorable	350	Flattop buckwheat	10
				Arizona cottontop	5
				Shrubby deervetch	5
				Desert globemallow	5
				False-mesquite	5
				Range ratany	5
				Mormon-tea	5
				Other shrubs	15
Rock outcrop.					
65*:					
Greyeagle	Limy Upland, 8-10" P.z.	Favorable	425	Creosotebush	45
		Normal	300	Bush muhly	10
		Unfavorable	200	Triangle bursage	5
				Other perennial grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other shrubs	5
				Other annual grasses	5
Continental	Clay Loam Upland, 8-10" P.z.	Favorable	850	Tobosa	25
		Normal	650	Big galleta	20
		Unfavorable	450	Threeawn	10
				Bush muhly	10
				Other shrubs	15
				Other perennial forbs	10
				Other annual forbs	10
Nickel	Limy Slopes, 8-10" P.z.	Favorable	500	Creosotebush	35
		Normal	400	White bursage	15
		Unfavorable	300	Bush muhly	10
				Big galleta	10
				Red grama	5
				Slim tridens	5
				Fluffgrass	5
				Coldenia	5
				Ephedra	5
				Range ratany	5
66*:					
Greyeagle	Limy Upland, 10-12" P.z.	Favorable	425	Creosotebush	45
		Normal	300	Bush muhly	10
		Unfavorable	200	Triangle bursage	5
				Other perennial grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other shrubs	5
Suncity Variant	Limy Upland, 10-12" P.z.	Favorable	425	Creosotebush	45
		Normal	300	Bush muhly	10
		Unfavorable	200	Triangle bursage	5
				Other perennial grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other annual grasses	5
				Other shrubs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
67---------- Guest	Clayey Bottom, 8-10" P.z.-----	Favorable Normal Unfavorable	2,000 1,000 400	Tobosa---------- Vine-mesquite---------- Other perennial forbs--------- Other perennial grasses-------	60 10 15 10
68*: Gunsight----------	Limy Upland, 7-10" P.z.-------	Favorable Normal Unfavorable	250 150 100	Creosotebush---------- Triangle bursage---------- White bursage---------- Bush muhly---------- Threeawn---------- White ratany---------- Other perennial forbs--------- Other annual forbs---------- Other shrubs----------	45 15 10 5 5 5 5 5 5
Cipriano----------	Limy Upland, 7-10" P.z.-------	Favorable Normal Unfavorable	250 175 100	White bursage---------- Triangle bursage---------- Bush muhly---------- Creosotebush---------- White ratany---------- Ocotillo---------- Other annual forbs---------- Other annual grasses---------- Other perennial forbs--------- Other shrubs----------	10 10 5 5 5 5 45 5 5 5
69*: Gunsight----------	Limy Upland, 2-7" P.z.--------	Favorable Normal Unfavorable	200 100 50	Creosotebush---------- Bush muhly---------- Triangle bursage---------- White bursage---------- White ratany---------- Other annual forbs---------- Other shrubs----------	70 5 5 5 5 5 5
Cipriano----------	Limy Upland, 2-7" P.z.--------	Favorable Normal Unfavorable	200 175 75	Creosotebush---------- Triangle bursage---------- White ratany---------- Bush muhly---------- White bursage---------- Brittlebush---------- Ocotillo---------- Other annual grasses---------- Other annual forbs---------- Other shrubs----------	45 10 10 5 5 5 5 5 5 5
70*: Gunsight----------	Limy Upland, 7-10" P.z.-------	Favorable Normal Unfavorable	250 150 100	Creosotebush---------- Triangle bursage---------- White bursage---------- Bush muhly---------- Threeawn---------- White ratany---------- Other perennial forbs--------- Other annual forbs---------- Other shrubs----------	45 15 10 5 5 5 5 5 5
Rillito----------	Limy Upland, 7-10" P.z.-------	Favorable Normal Unfavorable	300 200 150	Creosotebush---------- Triangle bursage---------- White bursage---------- White ratany---------- Threeawn---------- Bush muhly----------	50 10 5 5 5 5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
71*:					
Gunsight	Limy Upland, 2-7" P.z.	Favorable	200	Creosotebush	70
		Normal	100	Bush muhly	5
		Unfavorable	50	Triangle bursage	5
				White bursage	5
				White ratany	5
				Other annual forbs	5
				Other shrubs	5
Rillito	Limy Upland, 2-7" P.z.	Favorable	250	Creosotebush	70
		Normal	150	White bursage	5
		Unfavorable	100	White ratany	5
				Bush muhly	5
				Other annual grasses	5
				Other annual forbs	5
				Other shrubs	5
72*:					
Lehmans	Volcanic Hills, 10-12" P.z.	Favorable	900	Tobosa	25
		Normal	600	Jojoba	10
		Unfavorable	300	Curlymesquite	5
				Blue paloverde	5
				Slim tridens	5
				Sideoats grama	5
				Whitethorn	5
				Christmas-cactus	5
				Barrel cactus	5
				Big galleta	5
				White brittlebush	5
				Other shrubs	10
				Other perennial grasses	5
				Other perennial forbs	5
Rock outcrop.					
73*:					
Lehmans	Volcanic Hills, 8-10" P.z.	Favorable	800	Tobosa	20
		Normal	500	Big galleta	15
		Unfavorable	300	Curlymesquite	5
				Sideoats grama	5
				Barrel cactus	5
				White brittlebush	5
				Other shrubs	30
				Other perennial forbs	10
				Other perennial grasses	5
Rock outcrop.					
74*:					
Luke	Clay Loam Upland, 7-10" P.z.	Favorable	600	Threeawn	20
		Normal	400	Bush muhly	15
		Unfavorable	250	Tobosa	15
				Triangle bursage	10
				Littleleaf paloverde	5
				Cactus	5
				Other perennial forbs	10
				Other annual forbs	10
				Other annual grasses	5
				Other shrubs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
74*:					
Cipriano	Limy Upland 7-10" P.z.	Favorable	250	White bursage	10
		Normal	175	Triangle bursage	10
		Unfavorable	100	Bush muhly	5
				Creosotebush	5
				White ratany	5
				Ocotillo	5
				Other annual forbs	45
				Other perennial forbs	5
				Other annual grasses	5
				Other shrubs	5
75	Loamy Upland, 7-10" P.z.	Favorable	600	Bush muhly	40
Mohall		Normal	400	Plains bristlegrass	10
		Unfavorable	250	Threeawn	10
				Big galleta	5
				Arizona cottontop	5
				Tobosa	5
				Other annual forbs	15
				Other annual grasses	10
76	Limy Fan, 7-10" P.z.	Favorable	650	Creosotebush	40
Mohall		Normal	350	White ratany	5
		Unfavorable	200	Triangle bursage	5
				Bush muhly	5
				Threeawn	5
				Big galleta	5
				Other annual forbs	15
				Other perennial forbs	10
				Other annual grasses	10
77	Clay Loam Upland, 7-10" P.z.	Favorable	600	Tobosa	30
Mohall		Normal	400	Bush muhly	20
		Unfavorable	250	Threeawn	10
				Big galleta	5
				Plains bristlegrass	5
				Arizona cottontop	5
				Cactus	5
				Other annual grasses	10
				Other annual forbs	10
78	Limy Fan, 7-10" P.z.	Favorable	650	Creosotebush	40
Mohall		Normal	350	White ratany	5
		Unfavorable	200	Triangle bursage	5
				Bush muhly	5
				Threeawn	5
				Big galleta	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial forbs	10
80*:					
Mohall	Loamy Upland 7-10" P.z.	Favorable	600	Bush muhly	40
		Normal	400	Plains bristlegrass	10
		Unfavorable	250	Threeawn	10
				Big galleta	5
				Arizona cottontop	5
				Tobosa	5
				Other annual forbs	15
				Other annual grasses	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
80*:					
Tremant	Loamy Upland, 7-10" P.z.	Favorable	700	Big galleta	25
		Normal	450	Bush muhly	10
		Unfavorable	300	Creosotebush	5
				Triangle bursage	5
				Fourwing saltbush	5
				White ratany	5
				Threeawn	5
				Other annual grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other shrubs	5
				Other perennial grasses	5
81*:					
Mohall	Loamy Upland, 2-7" P.z.	Favorable	600	Big galleta	30
		Normal	400	White bursage	25
		Unfavorable	250	Bush muhly	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial grasses	5
				Other perennial forbs	5
				Other shrubs	5
Tremant	Loamy Upland, 2-7" P.z.	Favorable	650	White bursage	25
		Normal	350	Big galleta	20
		Unfavorable	200	Creosotebush	5
				White ratany	5
				Bush muhly	5
				Other annual forbs	15
				Other annual grasses	10
				Other shrubs	5
				Other perennial grasses	5
				Other perennial forbs	5
82, 83 Mohave	Loamy Upland, 8-10" P.z.	Favorable	800	Big galleta	30
		Normal	600	Bush muhly	20
		Unfavorable	400	Arizona cottontop	10
				Threeawn	5
				Desert globemallow	5
				Range ratany	5
				Mormon-tea	5
				White bursage	5
				Other annual forbs	10
				Other shrubs	5
84 Mohave	Limy Fan 8-10" P.z.	Favorable	700	Creosotebush	35
		Normal	550	White bursage	10
		Unfavorable	400	Whitestem paperflower	10
				Big galleta	5
				Bush muhly	5
				Threeawn	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial forbs	5
85 Mohave	Clay Loam Upland, 8-10" P.z.	Favorable	750	Tobosa	30
		Normal	550	Big galleta	15
		Unfavorable	350	Bush muhly	15
				Threeawn	5
				Desert globemallow	5
				Mormon-tea	5
				White bursage	5
				Other annual forbs	10
				Other shrubs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
86---------- Mohave	Limy Fan, 8-10" P.z.----------	Favorable	700	Creosotebush----------	35
		Normal	550	White bursage----------	10
		Unfavorable	400	Whitestem paperflower---------	10
				Big galleta----------	5
				Bush muhly----------	5
				Threeawn----------	5
				Other annual forbs----------	15
				Other annual grasses----------	10
				Other perennial forbs---------	5
87*:					
Mohave---------- Noncalcareous	Loamy Upland, 8-10" P.z.------	Favorable	800	Big galleta----------	30
		Normal	600	Bush muhly----------	20
		Unfavorable	400	Arizona cottontop----------	10
				Threeawn----------	5
				Desert globemallow----------	5
				Range ratany----------	5
				Mormon-tea----------	5
				White bursage----------	5
				Other annual forbs----------	10
				Other shrubs----------	5
Mohave---------- Calcareous	Limy Fan, 8-10" P.z.----------	Favorable	700	Creosotebush----------	35
		Normal	550	White bursage----------	10
		Unfavorable	400	Whitestem paperflower---------	10
				Big galleta----------	5
				Bush muhly----------	5
				Threeawn----------	5
				Other annual forbs----------	10
				Other annual grasses----------	10
				Other perennial forbs---------	5
88*:					
Mohave----------	Loamy Upland, 8-10" P.z.------	Favorable	800	Big galleta----------	30
		Normal	600	Bush muhly----------	20
		Unfavorable	400	Arizona cottontop----------	10
				Threeawn----------	5
				Desert globemallow----------	5
				Range ratany----------	5
				Mormon-tea----------	5
				White bursage----------	5
				Other annual forbs----------	10
				Other shrubs----------	5
Guest----------	Clayey Bottom, 8-10" P.z.-----	Favorable	2,000	Tobosa----------	60
		Normal	1,000	Vine-mesquite----------	10
		Unfavorable	400	Other perennial forbs---------	15
				Other perennial grasses-------	10
89*:					
Mohave----------	Loamy Upland, 8-10" P.z.------	Favorable	800	Big galleta----------	30
		Normal	600	Bush muhly----------	20
		Unfavorable	400	Arizona cottontop----------	10
				Threeawn----------	5
				Desert globemallow----------	5
				Range ratany----------	5
				Mormon-tea----------	5
				White bursage----------	5
				Other annual forbs----------	10
				Other shrubs----------	5
Tres Hermanos-----	Loamy Upland, 8-10" P.z.------	Favorable	800	Big galleta----------	25
		Normal	600	White bursage----------	25
		Unfavorable	400	Bush muhly----------	15
				Threeawn----------	5
				Creosotebush----------	5
				Other annual grasses----------	15
				Other annual forbs----------	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
90---------- Momoli	Sandy Loam Upland, 7-10" P.z.	Favorable	500	Triangle bursage----------	15
		Normal	400	Big galleta----------	10
		Unfavorable	300	Bush muhly----------	10
				Creosotebush----------	10
				White ratany----------	10
				Littleleaf paloverde----------	10
				Other annual grasses----------	10
				Other annual forbs----------	10
				Other perennial forbs----------	10
				Other shrubs----------	5
91*:					
Momoli----------	Limy Fan, 7-10" P.z.----------	Favorable	500	Creosotebush----------	40
		Normal	350	White ratany----------	10
		Unfavorable	250	Triangle bursage----------	10
				Big galleta----------	5
				Bush muhly----------	5
				Other annual forbs----------	15
				Other annual grasses----------	10
				Other shrubs----------	5
Carrizo----------	Limy Fan, 7-10" P.z.----------	Favorable	450	Creosotebush----------	40
		Normal	300	Burrowbush----------	10
		Unfavorable	150	Threeawn----------	5
				White bursage----------	5
				White ratany----------	5
				Littleleaf paloverde----------	5
				Other annual grasses----------	10
				Other annual forbs----------	10
				Other perennial forbs----------	5
				Other shrubs----------	5
92*:					
Momoli----------	Limy Fan, 2-7" P.z.----------	Favorable	400	Creosotebush----------	50
		Normal	250	White bursage----------	10
		Unfavorable	150	Big galleta----------	5
				Bush muhly----------	5
				White ratany----------	5
				Other annual forbs----------	15
				Other annual grasses----------	10
Carrizo----------	Limy Fan, 2-7" P.z.----------	Favorable	400	Creosotebush----------	50
		Normal	200	Triangle bursage----------	5
		Unfavorable	100	White ratany----------	5
				Other annual grasses----------	10
				Other annual forbs----------	10
				Other shrubs----------	10
				Other perennial forbs----------	5
				Other shrubs----------	5
93*:					
Nickel----------	Limy Slopes, 10-12" P.z.------	Favorable	600	Creosotebush----------	30
		Normal	400	Bush muhly----------	15
		Unfavorable	300	Red grama----------	15
				Black grama----------	5
				Arizona cottontop----------	5
				Slim tridens----------	5
				Fluffgrass----------	5
				Sand dropseed----------	5
				Coldenia----------	5
				Range ratany----------	5
				Other shrubs----------	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
93*:					
Cave	Limy Upland, 10-12" P.z.	Favorable	500	Bush muhly	30
		Normal	300	Creosotebush	20
		Unfavorable	150	Whitestem paperflower	10
				Slim tridens	5
				Desert zinnia	5
				Coldenia	5
				Whitethorn	5
				Fluffgrass	5
				Range ratany	5
				Other perennial grasses	5
94*:					
Nickel	Limy Slopes, 8-10" P.z.	Favorable	500	Creosotebush	35
		Normal	400	White bursage	15
		Unfavorable	300	Bush muhly	10
				Big galleta	10
				Red grama	5
				Slim tridens	5
				Fluffgrass	5
				Coldenia	5
				Ephedra	5
				Range ratany	5
Cave	Limy Upland, 8-10" P.z.	Favorable	400	Bush muhly	30
		Normal	250	Creosotebush	25
		Unfavorable	100	Whitethorn	10
				Slim tridens	5
				Coldenia	5
				Fluffgrass	5
				White bursage	5
				Range ratany	5
				Whitestem paperflower	5
				Other perennial grasses	5
95	Clayey Upland, 10-12" P.z.	Favorable	700	Tobosa	55
Ohaco		Normal	550	Creosotebush	5
		Unfavorable	400	Other annual grasses	10
				Other annual forbs	10
				Other perennial grasses	5
				Other perennial forbs	5
				Other shrubs	5
96*:					
Pinaleno	Loamy Upland, 10-12" P.z.	Favorable	800	Bush muhly	15
		Normal	500	Threeawn	15
		Unfavorable	375	Black grama	10
				Creosotebush	10
				Ocotillo	5
				Desert zinnia	5
				Mariola	5
				Slim tridens	5
				Fluffgrass	5
				Whitestem paperflower	5
				Other perennial grasses	10
				Other annual forbs	5
				Other shrubs	5
Tres Hermanos	Sandy Loam Upland, 10-12" P.z.	Favorable	900	Bush muhly	20
		Normal	600	Creosotebush	20
		Unfavorable	400	Slim tridens	10
				Rothrock grama	10
				Threeawn	5
				Desert zinnia	5
				Coldenia	5
				Mescat acacia	5
				Other annual grasses	10
				Other annual forbs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation*	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
97*:					
Pinaleno	Loamy Upland, 8-10" P.z.	Favorable	600	Bush muhly	20
		Normal	400	Big galleta	20
		Unfavorable	300	Threeawn	10
				Whitestem paperflower	10
				Other perennial grasses	15
				Other shrubs	15
				Other annual forbs	10
Tres Hermanos	Sandy Loam, Upland, 8-10" P.z.	Favorable	800	Big galleta	25
		Normal	600	White bursage	25
		Unfavorable	400	Bush muhly	15
				Threeawn	5
				Creosotebush	5
				Other annual grasses	15
				Other annual forbs	10
98*:					
Pinamt	Limy Fan, 7-10" P.z.	Favorable	350	Creosotebush	45
		Normal	200	Triangle bursage	10
		Unfavorable	100	White ratany	5
				Cactus	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial grasses	5
				Other shrubs	5
Tremant	Loamy Upland, 7-10" P.z.	Favorable	700	Big galleta	25
		Normal	450	Bush muhly	10
		Unfavorable	300	Creosotebush	5
				Triangle bursage	5
				Fourwing saltbush	5
				White ratany	5
				Threeawn	5
				Other annual grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other perennial grasses	5
99*:					
Pinamt	Limy Fan, 2-7" P.z.	Favorable	300	Creosotebush	60
		Normal	150	White bursage	5
		Unfavorable	100	White ratany	5
				Cactus	5
				Other annual forbs	15
				Other annual grasses	10
Tremant	Loamy Upland, 2-7" P.z.	Favorable	650	White bursage	25
		Normal	350	Big galleta	20
		Unfavorable	200	Creosotebush	5
				White ratany	5
				Bush muhly	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial grasses	5
				Other perennial forbs	5
100*:					
Quilotosa	Granitic Hills, 7-10" P.z.	Favorable	550	Littleleaf paloverde	20
		Normal	400	White ratany	15
		Unfavorable	250	Ironwood	10
				Desert globemallow	10
				Bush muhly	5
				Big galleta	5
				Mormon-tea	5
				Desertthorn	5
				Narrowleaf ditaxis	5
				White brittlebush	5
				California fagonia	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
100*:					
Vaiva	Granitic Hills, 7-10" P.z.	Favorable	500	Littleleaf paloverde	20
		Normal	400	White brittlebush	10
		Unfavorable	250	Triangle bursage	10
				Desert globemallow	10
				Ironwood	5
				Narrowleaf ditaxis	5
				Other perennial grasses	10
				Other annual forbs	10
				Other annual grasses	5
				Other shrubs	5
Rock outcrop.					
101 Rillito	Limy Upland, 7-10" P.z.	Favorable	300	Creosotebush	50
		Normal	200	Triangle bursage	10
		Unfavorable	150	White bursage	5
				White ratany	5
				Threeawn	5
				Bush muhly	5
				Other annual grasses	5
				Other perennial forbs	5
				Other annual forbs	5
				Other shrubs	5
102 Rillito	Limy Upland, 2-7" P.z.	Favorable	250	Creosotebush	70
		Normal	150	White bursage	5
		Unfavorable	100	White ratany	5
				Bush muhly	5
				Other annual grasses	5
				Other annual forbs	5
				Other shrubs	5
103*:					
Rock outcrop.					
Gachado	Volcanic Hills, 7-10" P.z.	Favorable	600	Littleleaf paloverde	10
		Normal	500	Buckhorn cholla	10
		Unfavorable	400	Desert globemallow	10
				Bush muhly	10
				Triangle bursage	5
				White brittlebush	5
				White ratany	5
				Ocotillo	5
				Big galleta	5
				Other shrubs	10
				Other perennial grasses	5
				Other annual grasses	5
				Other annual forbs	5
104*:					
Rock outcrop.					
Lehmans	Volcanic Hills, 10-12" P.z.	Favorable	900	Tobosa	25
		Normal	600	Jojoba	10
		Unfavorable	300	Curlymesquite	5
				Blue paloverde	5
				Slim tridens	5
				Sideoats grama	5
				Whitethorn	5
				Christmas-cactus	5
				Barrel cactus	5
				Big galleta	5
				White brittlebush	5
				Other shrubs	5
				Other perennial grasses	5
				Other perennial forbs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
105*:					
Rock outcrop.					
Lehmans	Volcanic Hills, 8-10" P.z.	Favorable	800	Tobosa	20
		Normal	500	Big galleta	15
		Unfavorable	300	Curlymesquite	5
				Sideoats grama	5
				Barrel cactus	5
				White brittlebush	5
				Other shrubs	30
				Other annual forbs	10
				Other perennial grasses	5
106*:					
Sal	Saline Upland (Loamy) 7-10" P.z.	Favorable	20	Turkshead	100
		Normal	10		
		Unfavorable	0		
Cipriano	Limy Upland, 7-10" P.z.	Favorable	250	White bursage	10
		Normal	175	Triangle bursage	10
		Unfavorable	100	Bush muhly	5
				Creosotebush	5
				White ratany	5
				Ocotillo	5
				Other annual forbs	45
				Other annual grasses	5
				Other perennial forbs	5
				Other shrubs	5
107*:					
Sal	Saline Upland (Loamy) 2-7" P.z.	Favorable	10	Turkshead	100
		Normal	5		
		Unfavorable	0		
Cipriano	Limy Upland, 2-7" P.z.	Favorable	200	Creosotebush	45
		Normal	175	Triangle bursage	10
		Unfavorable	75	White ratany	10
				Bush muhly	5
				White bursage	5
				Brittlebush	5
				Ocotillo	5
				Other annual grasses	5
				Other annual forbs	5
				Other shrubs	5
108*, 109*:					
Schenco	Schist Hills, 7-10" P.z.	Favorable	450	Bush muhly	10
		Normal	350	Narrowleaf ditaxis	10
		Unfavorable	250	Littleleaf paloverde	10
				Triangle bursage	10
				White brittlebush	10
				Creosotebush	5
				Ironwood	5
				White ratany	5
				Cactus	5
				Other shrubs	10
				Other perennial grasses	5
				Other annual grasses	5
				Other perennial forbs	5
				Other annual forbs	5
Rock outcrop.					

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
110*:					
Suncity	Limy Upland, 7-10" P.z.	Favorable	250	Creosotebush	35
		Normal	180	Triangle bursage	15
		Unfavorable	150	White bursage	10
				White ratany	5
				Bush muhly	5
				Threeawn	5
				Cactus	5
				Desert globemallow	5
				Other annual grasses	5
				Other perennial forbs	5
				Other annual forbs	5
Cipriano	Limy Upland, 7-10" P.z.	Favorable	250	White bursage	10
		Normal	175	Triangle bursage	10
		Unfavorable	100	Bush muhly	5
				Creosotebush	5
				White ratany	5
				Ocotillo	5
				Other annual forbs	45
				Other annual grasses	5
				Other perennial forbs	5
				Other shrubs	5
111	Limy Upland, 10-12" P.z.	Favorable	250	Bush muhly	30
Torriorthents		Normal	150	Creosotebush	20
		Unfavorable	100	Whitestem paperflower	10
				Slim tridens	5
				Desert zinnia	5
				Coldenia	5
				Whitethorn	5
				Fluffgrass	5
				Range ratany	5
				Other perennial grasses	10
112*:					
Tremant	Sandy Loam Upland, 7-10" P.z.	Favorable	700	Big galleta	25
Noncalcareous		Normal	450	Bush muhly	10
		Unfavorable	300	Creosotebush	5
				Triangle bursage	5
				Fourwing saltbush	5
				White ratany	5
				Threeawn	5
				Other perennial forbs	10
				Other annual forbs	10
				Other annual grasses	10
				Other shrubs	5
				Other perennial grasses	5
Tremant	Limy Fan, 7-10" P.z.	Favorable	600	Creosotebush	35
Calcareous		Normal	350	Triangle bursage	10
		Unfavorable	250	White ratany	10
				Cactus	5
				Bush muhly	5
				Big galleta	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	5
				Other shrubs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
113*:					
Tremant---------- Calcareous	Limy Fan, 7-10" P.z.----------	Favorable	600	Creosotebush----------	35
		Normal	350	Triangle bursage----------	10
		Unfavorable	250	White ratany----------	10
				Cactus----------	5
				Bush muhly----------	5
				Big galleta----------	5
				Other annual grasses----------	10
				Other annual forbs----------	10
				Other perennial forbs----------	5
				Other shrubs----------	5
Tremant---------- Noncalcareous	Loamy Upland, 7-10" P.z.------	Favorable	700	Big galleta----------	25
		Normal	450	Bush muhly----------	10
		Unfavorable	300	Creosotebush----------	5
				Triangle bursage----------	5
				Fourwing saltbush----------	5
				White ratany----------	5
				Threeawn----------	5
				Other perennial forbs----------	10
				Other annual forbs----------	10
				Other annual grasses----------	10
				Other perennial grasses-------	5
				Other shrubs----------	5
114*:					
Tremant---------- Calcareous	Limy Fan, 2-7" P.z.----------	Favorable	500	Creosotebush----------	45
		Normal	250	White bursage----------	10
		Unfavorable	150	White ratany----------	10
				Cactus----------	5
				Bush muhly----------	5
				Big galleta----------	5
				Other annual grasses----------	10
				Other perennial forbs----------	5
Tremant---------- Noncalcareous	Loamy Upland, 2-7" P.z.-------	Favorable	650	White bursage----------	25
		Normal	350	Big galleta----------	20
		Unfavorable	200	Creosotebush----------	5
				White ratany----------	5
				Bush muhly----------	5
				Other annual forbs----------	15
				Other annual grasses----------	10
				Other perennial grasses-------	5
				Other perennial forbs----------	5
				Other shrubs----------	5
115*:					
Tremant----------	Sandy Loam Upland 7-10" P.z.	Favorable	700	Big galleta----------	25
		Normal	450	Bush muhly----------	10
		Unfavorable	300	Creosotebush----------	5
				Triangle bursage----------	5
				Fourwing saltbush----------	5
				White ratany----------	5
				Threeawn----------	5
				Other annual grasses----------	10
				Other perennial forbs----------	10
				Other annual forbs----------	10
				Other perennial grasses-------	5
				Other shrubs----------	5
Antho----------	Sandy Loam Upland 7-10" P.z.	Favorable	800	Big galleta----------	30
		Normal	600	Bush muhly----------	15
		Unfavorable	400	Creosotebush----------	15
				White bursage----------	5
				White ratany----------	5
				Littleleaf paloverde----------	5
				Ironwood----------	5
				Other annual grasses----------	10
				Other annual forbs----------	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
116*:					
Tremant	Loamy Upland, 7-10" P.z.	Favorable	700	Big galleta	25
		Normal	450	Bush muhly	10
		Unfavorable	300	Creosotebush	5
				Triangle bursage	5
				Fourwing saltbush	5
				White ratany	5
				Threeawn	5
				Other annual grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other perennial grasses	5
				Other shrubs	5
Gunsight	Limy Upland, 7-10" P.z.	Favorable	250	Creosotebush	45
		Normal	150	Triangle bursage	15
		Unfavorable	100	White bursage	10
				Bush muhly	5
				Threeawn	5
				White ratany	5
				Other perennial forbs	5
				Other annual forbs	5
				Other shrubs	5
Rillito	Limy Upland, 7-10" P.z.	Favorable	300	Creosotebush	50
		Normal	200	Triangle bursage	10
		Unfavorable	150	White bursage	5
				White ratany	5
				Threeawn	5
				Bush muhly	5
				Other annual grasses	5
				Other perennial forbs	5
				Other annual forbs	5
				Other shrubs	5
117*:					
Tremant	Loamy Upland, 2-7" P.z.	Favorable	650	White bursage	25
		Normal	350	Big galleta	20
		Unfavorable	200	Creosotebush	5
				White ratany	5
				Bush muhly	5
				Other annual forbs	15
				Other annual grasses	10
				Other perennial grasses	5
				Other perennial forbs	5
				Other shrubs	5
Gunsight	Limy Upland, 2-7" P.z.	Favorable	200	Creosotebush	70
		Normal	100	Bush muhly	5
		Unfavorable	50	Triangle bursage	5
				White bursage	5
				White ratany	5
				Other annual forbs	5
				Other shrubs	5
Rillito	Limy Upland, 2-7" P.z.	Favorable	250	Creosotebush	70
		Normal	150	White bursage	5
		Unfavorable	100	White ratany	5
				Bush muhly	5
				Other annual grasses	5
				Other annual forbs	5
				Other shrubs	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
118*:					
Tremant	Sandy Loam Upland, 7-10" P.z.	Favorable	700	Big galleta	25
		Normal	450	Bush muhly	10
		Unfavorable	300	Creosotebush	5
				Triangle bursage	5
				Fourwing saltbush	5
				White ratany	5
				Threeawn	5
				Other annual grasses	10
				Other perennial forbs	10
				Other annual forbs	10
				Other perennial grasses	5
				Other shrubs	5
Rillito	Limy Upland, 7-10" P.z.	Favorable	300	Creosotebush	50
		Normal	200	Triangle bursage	10
		Unfavorable	150	White bursage	5
				White ratany	5
				Threeawn	5
				Bush muhly	5
				Other annual grasses	5
				Other perennial forbs	5
				Other annual forbs	5
				Other shrubs	5
119*:					
Tremant	Limy Fan, 2-7" P.z.	Favorable	500	Creosotebush	45
		Normal	250	White bursage	10
		Unfavorable	150	White ratany	10
				Cactus	5
				Bush muhly	5
				Big galleta	5
				Other annual grasses	10
				Other annual forbs	10
Suncity	Loamy Upland, 2-7" P.z.	Favorable	500	White bursage	20
		Normal	300	Creosotebush	10
		Unfavorable	200	Threeawn	10
				Desert globemallow	10
				White ratany	5
				Bush muhly	5
				Cactus	5
				Big galleta	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	10
120*:					
Tres Hermanos Noncalcareous	Sandy Loam Upland, 8-10" P.z.	Favorable	800	Big galleta	25
		Normal	600	White bursage	25
		Unfavorable	400	Bush muhly	15
				Creosotebush	5
				Threeawn	5
				Other annual grasses	15
				Other annual forbs	10
Tres Hermanos Calcareous	Limy Fan, 8-10" P.z.	Favorable	800	Creosotebush	40
		Normal	500	Big galleta	10
		Unfavorable	350	White bursage	10
				Bush muhly	5
				Threeawn	5
				Other annual grasses	15
				Other annual forbs	15

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
121*:					
Tres Hermanos	Sandy Loam Upland, 10-12" P.z.	Favorable	900	Bush muhly	20
		Normal	600	Creosotebush	20
		Unfavorable	400	Rothrock grama	10
				Slim tridens	10
				Mescat acacia	5
				Desert zinnia	5
				Coldenia	5
				Threeawn	5
				Other annual grasses	10
				Other annual forbs	10
Anthony	Sandy Bottom, 10-12" P.z.	Favorable	650	Bush muhly	40
		Normal	500	Rothrock grama	20
		Unfavorable	450	Arizona cottontop	5
				Threeawn	5
				Dropseed	5
				Soaptree yucca	5
				White ratany	5
				Fourwing saltbush	5
				Other shrubs	10
122 Vado	Sandy Loam Upland, 10-12" P.z.	Favorable	1,200	Bush muhly	15
		Normal	800	Arizona cottontop	10
		Unfavorable	600	Triangle bursage	10
				Jojoba	5
				Range ratany	5
				Littleleaf paloverde	5
				Desertthorn	5
				Fourwing saltbush	5
				Other perennial grasses	15
				Other perennial forbs	10
				Other annual forbs	5
				Other annual grasses	5
				Other shrubs	5
123 Vaiva	Shallow Upland, 7-10" P.z.	Favorable	350	Triangle bursage	20
		Normal	300	Littleleaf paloverde	15
		Unfavorable	150	Ironwood	10
				Narrowleaf ditaxis	5
				Desert globemallow	5
				Other shrubs	10
				Other perennial grasses	5
				Other annual grasses	5
				Other annual forbs	5
124*:					
Valencia Noncalcareous	Sandy Loam Upland, 7-10" P.z.	Favorable	600	Big galleta	20
		Normal	450	Fourwing saltbush	15
		Unfavorable	350	Bush muhly	10
				Creosotebush	5
				Triangle bursage	5
				White ratany	5
				Threeawn	5
				Desert globemallow	5
				Other annual grasses	10
				Other annual forbs	10
				Other shrubs	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
124*:					
Valencia	Limy Fan, 7-10" P.z.	Favorable	550	Creosotebush	35
Calcareous		Normal	400	Triangle bursage	10
		Unfavorable	300	White ratany	5
				Big galleta	5
				Bush muhly	5
				Threeawn	5
				Desert globemallow	5
				Other annual forbs	15
				Other annual grasses	10
				Other shrubs	5
125	Sandy Upland, 7-10" P.z.	Favorable	1,200	Big galleta	60
Vint		Normal	800	Longleaf mormon-tea	5
		Unfavorable	500	Fourwing saltbush	5
				Other annual grasses	10
				Other annual forbs	10
				Other perennial forbs	5
				Other shrubs	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--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
1*:					
Antho---------- Noncalcareous	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.
Antho---------- Calcareous	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.
2*:					
Antho---------- Noncalcareous	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, droughty.
Antho---------- Calcareous	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, droughty.
3*:					
Antho----------	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.
Carrizo----------	Severe: flooding, small stones, too sandy.	Severe: too sandy, small stone.	Severe: small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, droughty.
Maripo----------	Severe: flooding.	Slight----------	Slight----------	Slight----------	Moderate: droughty.
4*:					
Antho----------	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.
Carrizo----------	Severe: flooding, small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, droughty.
Maripo----------	Severe: flooding.	Slight----------	Slight----------	Slight----------	Moderate: droughty.
5---------- Anthony	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.
6*, 7*:					
Anthony----------	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.
Arizo----------	Severe: flooding.	Slight----------	Moderate: small stones.	Slight----------	Severe: droughty.
8---------- Arizo	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Severe: large stones, droughty.
9*:					
Beeline----------	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
9*:					
Cipriano	Severe: slope, small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Moderate: slope, dusty.	Severe: small stones, slope, thin layer.
10*, 11*:					
Brios	Severe: flooding.	Slight	Moderate: slope, flooding.	Slight	Severe: droughty.
Carrizo	Severe: flooding, small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, droughty.
12 Carefree	Moderate: large stones, percs slowly.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Severe: large stones.
13*:					
Carefree	Moderate: large stones, percs slowly.	Moderate: large stones, too clayey.	Severe: large stones.	Moderate: large stones, too clayey.	Severe: large stones, too clayey.
Beardsley	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Severe: large stones.
14 Carrizo	Severe: flooding, small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, droughty.
15*:					
Carrizo	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Severe: droughty.
Gunsight	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
16*, 17*:					
Cellar	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.
Rock outcrop.					
18*:					
Cherioni	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope, small stones.	Severe: small stones, large stones, droughty.
Rock outcrop.					
19*, 20*:					
Chuckawalla	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
Gunsight	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
21---------- Cipriano	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Moderate: dusty.	Severe: small stones, thin layer.
22---------- Contine	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
23---------- Contine	Moderate: too clayey.	Moderate: too clayey.	Severe: too clayey.	Moderate: too clayey.	Severe: too clayey.
24---------- Continental	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Slight.
25---------- Continental	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Severe: too clayey.
26---------- Continental	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Slight.
27*: Continental----------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Mohave----------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
28*: Continental----------	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Slight.
Ohaco----------	Moderate: small stones, dusty.	Moderate: small stones, dusty.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, thin layer.
29*, 30*: Denure----------	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
Momoli----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Severe: droughty.
Carrizo----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Severe: droughty.
31*, 32*: Dixaleta----------	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
Rock outcrop.					
33---------- Eba	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
34, 35---------- Eba	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
36*: Eba----------	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
36*:					
Continental	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
37*, 38*:					
Eba	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
Continental	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Cave	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, small stones, cemented pan.	Moderate: dusty.	Severe: thin layer.
39*:					
Eba	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
Nickel	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty, slope.
Cave	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, small stones, cemented pan.	Moderate: dusty.	Severe: thin layer.
40*:					
Eba	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
Pinaleno	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
41*:					
Eba	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Pinaleno	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
42*:					
Eba	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
Pinaleno	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
43*:					
Eba	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
43*: Pinaleno	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
44--- Ebon	Severe: small stones.	Severe: small stones.	Severe: small stones.	Moderate: dusty.	Severe: small stones.
45--- Ebon	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Moderate: dusty.	Severe: small stones.
46*: Ebon	Severe: small stones.	Severe: small stones.	Severe: small stones.	Moderate: dusty.	Severe: small stones.
Contine	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
47*: Ebon	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight---	Severe: small stones.
Gunsight	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
Cipriano	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Moderate: dusty.	Severe: small stones, thin layer.
48*: Ebon	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Moderate: dusty.	Severe: small stones.
Pinamt	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
49*: Ebon	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Pinamt	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, droughty.
50*: Estrella Calcareous	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
Estrella Noncalcareous	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
51*: Gachado	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, slope, thin layer.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
51*:					
Lomitas	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
52*:					
Gachado	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.
Lomitas	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Rock outcrop.					
53--- Gadsden	Severe: flooding.	Moderate: too clayey.	Moderate: too clayey.	Slight---	Severe: too clayey.
54*:					
Gila--- Noncalcareous	Severe: flooding.	Slight---	Slight---	Slight---	Slight.
Gila--- Calcareous	Severe: flooding.	Slight---	Slight---	Slight---	Slight.
55*, 56*:					
Gilman--- Noncalcareous	Severe: flooding.	Slight---	Slight---	Slight---	Slight.
Gilman--- Calcareous	Severe: flooding.	Slight---	Slight---	Slight---	Slight.
57--- Gilman	Severe: flooding.	Slight---	Slight---	Slight---	Slight.
58*, 59*:					
Gilman	Severe: flooding.	Slight---	Slight---	Slight---	Slight.
Momoli	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight---	Severe: droughty.
Denure	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight---	Slight.
60*:					
Glenbar--- Noncalcareous	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
Glenbar--- Calcareous	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
61*, 62*:					
Gran	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
Wickenburg	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight---	Severe: droughty, thin layer.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
63*, 64*:					
Gran	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Wickenburg	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: droughty, slope.
Rock outcrop.					
65*:					
Greyeagle	Severe: slope, small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Severe: small stones.	Severe: small stones, droughty, slope.
Continental	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Nickel	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: small stones, slope.
66*:					
Greyeagle	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones.	Severe: small stones, droughty.
Suncity Variant	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Slight	Severe: small stones, thin layer.
67 Guest	Severe: flooding.	Moderate: too clayey.	Moderate: too clayey.	Slight	Severe: too clayey.
68*, 69*:					
Gunsight	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
Cipriano	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Moderate: dusty.	Severe: small stones, thin layer.
70*:					
Gunsight	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
Rillito	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, droughty, slope.
71*:					
Gunsight	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
71*: Rillito	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: dusty.	Severe: small stones, slope.
72*, 73*: Lehmans	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.
Rock outcrop.					
74*: Luke	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: erodes easily.	Severe: small stones.
Cipriano	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Moderate: dusty.	Severe: small stones, thin layer.
75--- Mohall	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight---	Slight.
76--- Mohall	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
77, 78--- Mohall	Slight---	Slight---	Slight---	Slight---	Slight.
79--- Mohall	Moderate: too clayey.	Moderate: too clayey.	Severe: too clayey.	Moderate: too clayey.	Severe: too clayey.
80*, 81*: Mohall	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Slight---	Slight.
Tremant	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones.
82--- Mohave	Slight---	Slight---	Slight---	Slight---	Slight.
83--- Mohave	Moderate: dusty.	Moderate: dusty.	Slight---	Moderate: dusty.	Slight.
84--- Mohave	Slight---	Slight---	Slight---	Slight---	Slight.
85--- Mohave	Slight---	Slight---	Slight---	Slight---	Slight.
86--- Mohave	Slight---	Slight---	Slight---	Slight---	Slight.
87*: Mohave Noncalcareous	Slight---	Slight---	Slight---	Slight---	Slight.
Mohave Calcareous	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight---	Moderate: small stones.
88*: Mohave	Slight---	Slight---	Slight---	Slight---	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
88*: Guest	Severe: flooding.	Slight	Slight	Severe: erodes easily.	Slight.
89*: Mohave.	Slight	Slight	Moderate: slope.	Slight	Slight.
Tres Hermanos	Slight	Slight	Severe: small stones.	Moderate: dusty.	Moderate: small stones, droughty.
90 Momoli	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Severe: droughty.
91*: Momoli	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
Carrizo	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: droughty.
92*: Momoli	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
Carrizo	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
93*, 94*: Nickel	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Cave	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: slope, small stones, cemented pan.	Moderate: slope, dusty.	Severe: slope, thin layer.
95 Ohaco	Moderate: small stones, dusty.	Moderate: small stones, dusty.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, thin layer.
96*, 97*: Pinaleno	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
Tres Hermanos	Slight	Slight	Severe: small stones.	Moderate: dusty.	Moderate: small stones, droughty.
98*, 99*: Pinamt	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
Tremant	Slight	Slight	Severe: small stones.	Moderate: dusty.	Moderate: small stones.
100*: Quilotosa	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
100*:					
Vaiva	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
Rock outcrop.					
101--- Rillito	Slight	Slight	Moderate: small stones.	Moderate: dusty.	Moderate: droughty.
102--- Rillito	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, droughty.
103*:					
Rock outcrop.					
Gachado	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.
104*, 105*:					
Rock outcrop.					
Lehmans	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.
106*, 107*:					
Sal	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones.	Severe: small stones, droughty, thin layer.
Cipriano	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Slight	Severe: small stones, thin layer.
108*:					
Schenco	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, droughty.
Rock outcrop.					
109*:					
Schenco	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
Rock outcrop.					
110*:					
Suncity	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Moderate: dusty.	Severe: small stones, droughty, thin layer.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
110*: Cipriano	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Moderate: dusty.	Severe: small stones, thin layer.
111. Torriorthents					
112*: Tremant, Noncalcareous	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
Tremant, Calcareous	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
113*, 114*: Tremant, Calcareous	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones.
Tremant, Noncalcareous	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones.
115*: Tremant	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
Antho	Severe: flooding.	Slight	Slight	Slight	Slight.
116*, 117*: Tremant	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones.
Gunsight	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
Rillito	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, droughty.
118*: Tremant	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
Rillito	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, droughty.
119*: Tremant	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones.
Suncity	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones.	Severe: small stones.
120*: Tres Hermanos, Noncalcareous	Slight	Slight	Severe: small stones.	Slight	Moderate: small stones, droughty.
Tres Hermanos, Calcareous	Slight	Slight	Severe: small stones.	Slight	Moderate: small stones, droughty.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
121*: Tres Hermanos	Slight	Slight	Severe: small stones.	Moderate: dusty.	Moderate: small stones, droughty.
Anthony	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
122. Vado					
123 Vaiva	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, droughty.
124*: Valencia Noncalcareous	Severe: flooding.	Slight	Moderate: small stones.	Slight	Slight.
Valencia Calcareous	Severe: flooding.	Slight	Moderate: small stones.	Slight	Slight.
125 Vint	Severe: flooding.	Slight	Moderate: slope.	Slight	Moderate: droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
1*, 2*:									
Antho---------- Noncalcareous	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor.
Antho---------- Calcareous	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor.
3*, 4*:									
Antho----------	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor.
Carrizo----------	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Maripo----------	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
5---------- Anthony	Good	Good	Good	Good	Very poor.	Very poor.	Good	Very poor.	Poor.
6*, 7*:									
Anthony----------	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Arizo----------	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Good.
8---------- Arizo	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Good.
9*:									
Beeline----------	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cipriano----------	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
10*, 11*:									
Brios----------	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Carrizo----------	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
12---------- Carefree	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
13*:									
Carefree----------	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Beardsley----------	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
14---------- Carrizo	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
15*:									
Carrizo----------	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Gunsight----------	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
16*, 17*:									
Cellar	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Rock outcrop.									
18*:									
Cherioni	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop.									
19*, 20*:									
Chuckawalla	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Gunsight	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
21--- Cipriano	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
22, 23--- Contine	Good	Good	Good	Good	Good	Good	Good	Good	Poor.
24, 25--- Continental	Good	Good	Good	Good	Good	Good	Good	Good	Poor.
26--- Continental	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
27*:									
Continental	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Mohave.									
28*:									
Continental	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Ohaco	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
29*, 30*:									
Denure	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor.
Momoli	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Carrizo	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
31*, 32*:									
Dixaleta.	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Rock outcrop.									
33, 34, 35--- Eba	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
36*:									
Eba	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
36*:									
Continental	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
37*, 38*:									
Eba	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Continental	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cave	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
39*:									
Eba	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Nickel	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cave	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
40*, 41*, 42*, 43*:									
Eba	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Pinaleno	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
44, 45 Ebon	Very poor.	Very poor.	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
46*:									
Ebon	Very poor.	Very poor.	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Contine	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
47*:									
Ebon	Very poor.	Very poor.	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Gunsight	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cipriano	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
48*, 49*:									
Ebon	Very poor.	Very poor.	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Pinamt	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
50*:									
Estrella Calcareous	Good	Good	Good	Good	Poor	Fair	Good	Poor	Poor.
Estrella Noncalcareous	Good	Good	Good	Good	Poor	Fair	Good	Poor	Poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
51*:									
Gachado	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Lomitas	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
52*:									
Gachado	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Lomitas	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rock outcrop.									
53--- Gadsden	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
54*:									
Gila--- Noncalcareous	Good	Good	Fair	Fair	Good	Fair	Good	Good	Poor.
Gila--- Calcareous	Good	Good	Fair	Fair	Good	Fair	Good	Good	Poor.
55*, 56*:									
Gilman	Good	Good	Good	Good	Good	Fair	Good	Fair	Poor.
Gilman	Good	Good	Good	Good	Good	Fair	Good	Fair	Poor.
57--- Gilman	Good	Good	Good	Good	Good	Fair	Good	Fair	---
58*, 59*:									
Gilman	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor.
Momoli	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Denure	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor.
60*:									
Glenbar--- Noncalcareous	Good	Good	Good	Good	Good	Fair	Good	Fair	Poor.
Glenbar--- Calcareous	Good	Good	Good	Good	Good	Fair	Good	Fair	Poor.
61*, 62*:									
Gran	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Wickenburg	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
63*, 64*:									
Gran	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Wickenburg	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rock outcrop.									

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
65*:									
Greyeagle	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Continental	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Nickel	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
66*:									
Greyeagle	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Suncity Variant	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
67--- Guest	Good	Good	Good	Fair	Good	Good	Good	Good	Fair.
68*, 69*:									
Gunsight	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cipriano	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
70*, 71*:									
Gunsight	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rillito	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
72*, 73*:									
Lehmans	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
Rock outcrop.									
74*:									
Luke	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cipriano	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
75--- Mohall	Good	Good	Good	Good	Poor	Fair	Good	Poor	Poor.
76--- Mohall	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
77, 78, 79--- Mohall	Good	Good	Good	Good	Poor	Fair	Good	Poor	Poor.
80*, 81*:									
Mohall	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Tremant	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
82, 83, 84, 85, 86- Mohave	Good	Good	Fair	Fair	Poor	Poor	Good	Poor	Poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
87*:									
Mohave Noncalcareous	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Mohave Calcareous	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
88*:									
Mohave	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Guest	Poor	Poor	Fair	Poor	Very poor.	Very poor.	Poor	Very poor.	Fair.
89*:									
Mohave	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Tres Hermanos	Very poor.	Very poor.	Poor	Fair	Poor	Very poor.	Very poor.	Very poor.	Fair.
90--- Momoli	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
91*:									
Momoli	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Carrizo	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
92*:									
Momoli	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Carrizo	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Poor	Very poor.	Poor.
93*, 94*:									
Nickel	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cave	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
95--- Ohaco	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
96*, 97*:									
Pinaleno	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Tres Hermanos	Very poor.	Very poor.	Poor	Fair	Poor	Very poor.	Very poor.	Very poor.	Fair.
98*, 99*:									
Pinamt	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Tremant	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
100*:									
Quilotosa	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
100*:									
Vaiva	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rock outcrop.									
101 Rillito	Good	Good	Good	Good	Poor	Very poor.	Good	Poor	Poor.
102 Rillito	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
103*:									
Rock outcrop.									
Gachado	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
104*, 105*:									
Rock outcrop.									
Lehmans	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Fair.
106*, 107*:									
Sal	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Cipriano	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
108*, 109*:									
Schenco	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rock outcrop.									
110*:									
Suncity	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Cipriano	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
111. Torriorthents									
112*:									
Tremant Noncalcareous	Good	Good	Good	Good	Poor	Good	Good	Poor	Poor.
Tremant Calcareous	Good	Good	Good	Good	Poor	Good	Good	Poor	Poor.
113*, 114*:									
Tremant Calcareous	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Tremant Noncalcareous	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
115*:									
Tremant	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Antho	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
116*, 117*:									
Tremant	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Gunsight	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rillito	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
118*:									
Tremant	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rillito	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
119*:									
Tremant	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Suncity	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
120*:									
Tres Hermanos, Noncalcareous	Very poor.	Very poor.	Poor	Fair	Poor	Very poor.	Very poor.	Very poor.	Fair.
Tres Hermanos, Calcareous	Very poor.	Very poor.	Poor	Fair	Poor	Very poor.	Very poor.	Very poor.	Fair.
121*:									
Tres Hermanos	Very poor.	Very poor.	Poor	Fair	Poor	Very poor.	Very poor.	Very poor.	Fair.
Anthony	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
122. Vado									
123, Vaiva	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
124*:									
Valencia, Noncalcareous	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor.
Valencia, Calcareous	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor.
125, Vint	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--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]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1*:					
Antho---------- Noncalcareous	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Antho---------- Calcareous	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
2*:					
Antho---------- Noncalcareous	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: small stones, droughty.
Antho---------- Calcareous	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: small stones, droughty.
3*:					
Antho----------	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Carrizo----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones, droughty.
Maripo----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
4*:					
Antho----------	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Carrizo----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones, droughty.
Maripo----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
5---------- Anthony	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
6*, 7*:					
Anthony----------	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Arizo----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.
8---------- Arizo	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Severe: large stones, droughty.
9*:					
Beeline----------	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, thin layer.
Cipriano---------	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: small stones, slope, thin layer.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
10*, 11*:					
Brios	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.
Carrizo	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones, droughty.
12--- Carefree	Severe: cemented pan.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: large stones.
13*:					
Carefree	Severe: cemented pan.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: large stones, too clayey.
Beardsley	Severe: cemented pan.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: large stones.
14--- Carrizo	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: small stones, droungty.
15*:					
Carrizo	Severe: cutbanks cave.	Slight	Slight	Slight	Severe: droughty.
Gunsight	Slight	Slight	Slight	Slight	Severe: small stones, droughty.
16*, 17*:					
Cellar	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope, thin layer.
Rock outcrop.					
18*:					
Cherioni	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock, cemented pan.	Severe: slope, depth to rock, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: small stones, large stones, droughty.
Rock outcrop.					
19*, 20*:					
Chuckawalla	Severe: cutbanks cave.	Slight	Slight	Slight	Severe: small stones, droughty.
Gunsight	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, droughty.
21--- Cipriano	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
22--- Contine	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
23---------- Contine	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
24---------- Continental	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
25---------- Continental	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
26---------- Continental	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
27*: Continental------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Mohave----------	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
28*: Continental------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Ohaco----------	Severe: cemented pan.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: small stones, thin layer.
29*, 30*: Denure----------	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
Momoli----------	Slight----------	Slight----------	Slight----------	Slight----------	Severe:
Carrizo----------	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Severe: droughty.
31*, 32*: Dixaleta---------	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
Rock outcrop.					
33---------- Eba	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: small stones.
34, 35---------- Eba	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: slope, shrink-swell.	Severe: small stones.
36*: Eba----------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: small stones.
Continental------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
37*, 38*:					
Eba	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: small stones.
Continental	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Cave	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: thin layer.
39*:					
Eba	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: small stones.
Nickel	Severe: cutbanks cave.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty, slope.
Cave	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: thin layer.
40*:					
Eba	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: slope, shrink-swell.	Severe: small stones.
Pinaleno	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
41*:					
Eba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Pinaleno	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
42*:					
Eba	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: slope, shrink-swell.	Severe: small stones.
Pinaleno	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
43*:					
Eba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Pinaleno	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
44 Ebon	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: small stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
45---------- Ebon	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: slope, shrink-swell.	Severe: small stones.
46*: Ebon----------	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: small stones.
Contine----------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
47*: Ebon----------	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: small stones.
Gunsight----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
Cipriano----------	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
48*: Ebon----------	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: slope, shrink-swell.	Severe: small stones.
Pinamt----------	Moderate: large stones, slope.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Severe: small stones, droughty.
49*: Ebon----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Pinamt----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty.
50*: Estrella---------- Calcareous	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Slight.
Estrella---------- Noncalcareous	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Slight.
51*: Gachado----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope, thin layer.
Lomitas----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
52*:					
Gachado	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope, thin layer.
Lomitas	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope.
Rock outcrop.					
53--- Gadsden	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
54*:					
Gila Noncalareous	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Gila Calcareous	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
55*, 56*:					
Gilman Noncalcareous	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Gilman Calcareous	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
57--- Gilman	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
58*, 59*:					
Gilman	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Momoli	Severe: cutbanks cave.	Slight	Slight	Slight	Severe: droughty.
Denure	Slight	Slight	Slight	Slight	Slight.
60*:					
Glenbar Noncalcareous	Slight	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
Glenbar Calcareous	Slight	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
61*, 62*:					
Gran	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Moderate: depth to rock, shrink-swell.	Severe: small stones.
Wickenburg	Severe: depth to rock.	Moderate: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: droughty, thin layer.
63*, 64*:					
Gran	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
63*, 64*: Wickenburg	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Rock outcrop.					
65*: Greyeagle	Severe: cemented pan, cutbanks cave, slope.	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: small stones, droughty, slope.
Continental	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Nickel	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
66*: Greyeagle	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, droughty.
Suncity Variant	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
67--- Guest	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
68*, 69*: Gunsight	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, droughty.
Cipriano	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
70*: Gunsight	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
Rillito	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty, slope.
71*: Gunsight	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
Rillito	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
72*, 73*: Lehmans	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: small stones, slope, thin layer.
Rock outcrop.					
74*: Luke	Severe: cemented pan.	Moderate: shrink-swell, cemented pan.	Moderate: shrink-swell, slope, cemented pan.	Moderate: cemented pan, shrink-swell.	Severe: small stones.
Cipriano	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
75, 76, 77, 78--- Mohall	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight.
79--- Mohall	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: too clayey.
80*, 81*: Mohall	Slight	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
Tremant	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones.
82, 83--- Mohave	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
84--- Mohave	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight.
85--- Mohave	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Severe: too clayey.
86--- Mohave	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight.
87*: Mohave Noncalcareous	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Mohave Calcareous	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: small stones.
88*: Mohave	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Guest	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.	Slight.
89*: Mohave	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
89*: Tres Hermanos----	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.	Moderate: small stones, droughty.
90---------- Momoli	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Severe: droughty.
91*: Momoli----------	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Severe: small stones.
Carrizo----------	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Severe: droughty.
92*: Momoli----------	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Severe: small stones.
Carrizo----------	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Severe: small stones.
93*, 94*: Nickel----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cave----------	Severe: cemented pan, cutbanks cave, slope.	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: slope, thin layer.
95---------- Ohaco	Severe: cemented pan.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: small stones, thin layer.
96*, 97*: Pinaleno---------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Severe: small stones.
Tres Hermanos----	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.	Moderate: small stones, droughty.
98*, 99*: Pinamt----------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Severe: small stones.
Tremant----------	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones.
100*: Quilotosa--------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, droughty, slope.
Vaiva----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, droughty, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
101---------- Rillito	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty.
102---------- Rillito	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: small stones, droughty.
103*: Rock outcrop.					
Gachado----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope, thin layer.
104*, 105*: Rock outcrop.					
Lehmans----------	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: small stones, slope, thin layer.
106*, 107*: Sal----------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, droughty, thin layer.
Cipriano---------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
108*: Schenco----------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: small stones, droughty.
Rock outcrop.					
109*: Schenco----------	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
Rock outcrop.					
110*: Suncity----------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, droughty, thin layer.
Cipriano---------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
111. Torriorthents					
112*, 113*, 114*: Tremant---------- Calcareous	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
112*, 113*, 114*: Tremant---------- Noncalcareous	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones.
115*: Tremant----------	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones.
Antho----------	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
116*, 117*: Tremant----------	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones.
Gunsight---------	Slight----------	Slight----------	Slight----------	Slight----------	Severe: small stones, droughty.
Rillito----------	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: small stones, droughty.
118*: Tremant----------	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones.
Rillito----------	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: small stones, droughty.
119*: Tremant----------	Slight----------	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones.
Suncity----------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: droughty, thin layer.
120*: Tres Hermanos---- Noncalcareous	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones, droughty.
Tres Hermanos---- Calcareous	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones, droughty.
121*: Tres Hermanos----	Slight----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: small stones, droughty.
Anthony----------	Slight----------	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
122---------- Vado	Slight----------	Slight----------	Slight----------	slight----------	Severe: droughty.
123---------- Vaiva	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, droughty.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
124*:					
Valencia, Noncalcareous	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Valencia, Calcareous	Slight	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
125--- Vint	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1*:					
Antho---------- Noncalcareous	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Antho---------- Calcareous	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
2*:					
Antho---------- Noncalcareous	Moderate: flooding, percs slowly.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Fair: small stones.
Antho---------- Calcareous	Moderate: flooding, percs slowly.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Fair: small stones.
3*, 4*:					
Antho----------	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Carrizo----------	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
Maripo----------	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
5---------- Anthony	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
6*, 7*:					
Anthony----------	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Arizo----------	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, small stones.
8---------- Arizo	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy, large stones.	Severe: flooding.	Poor: seepage, small stones.
9*:					
Beeline----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Cipriano----------	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 10.--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
10*, 11*: Brios	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy.
Carrizo	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
12--- Carefree	Severe: percs slowly.	Moderate: slope, large stones.	Severe: too clayey.	Slight---	Poor: too clayey, hard to pack.
13*: Carefree	Severe: percs slowly.	Moderate: large stones.	Severe: too clayey.	Slight---	Poor: too clayey, hard to pack.
Beardsley	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
14--- Carrizo	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
15*: Carrizo	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight---	Poor: seepage, too sandy.
Gunsight	Moderate: percs slowly.	Moderate: seepage, slope.	Slight---	Slight---	Poor: small stones.
16*, 17*: Cellar	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Rock outcrop.					
18*: Cherioni	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, slope.
Rock outcrop.					
19*, 20*: Chuckawalla	Severe: poor filter.	Severe: seepage.	Severe: excess salt.	Slight---	Poor: seepage, small stones.
Gunsight	Moderate: percs slowly.	Moderate: seepage, slope.	Slight---	Slight---	Poor: small stones.
21--- Cipriano	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
22, 23--- Contine	Severe: percs slowly.	Slight---	Slight---	Slight---	Good.

See footnote at end of table.

TABLE 10.--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
24, 25--- Continental	Severe: percs slowly.	Slight---	Slight---	Slight---	Poor: hard to pack.
26--- Continental	Severe: percs slowly.	Moderate: slope.	Slight---	Slight---	Poor: hard to pack.
27*: Continental---	Severe: percs slowly.	Moderate: slope.	Slight---	Slight---	Poor: hard to pack.
Mohave---	Severe: percs slowly.	Severe: seepage.	Slight---	Slight---	Fair: thin layer.
28*: Continental---	Severe: percs slowly.	Slight---	Slight---	Slight---	Poor: hard to pack.
Ohaco---	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
29*, 30*: Denure---	Slight---	Severe: seepage.	Slight---	Slight---	Good.
Momoli---	Slight---	Severe: seepage	Slight---	Slight---	Poor: small stones
Carrizo---	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight---	Poor: seepage, too sandy.
31*, 32*: Dixaleta---	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Rock outcrop.					
33--- Eba	Severe: percs slowly.	Severe: seepage.	Slight---	Slight---	Poor: small stones.
34, 35--- Eba	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
36*: Eba---	Severe: percs slowly.	Severe: seepage.	Slight---	Slight---	Poor: small stones.
Continental---	Severe: percs slowly.	Moderate: slope.	Slight---	Slight---	Poor: hard to pack.
37*, 38*: Eba---	Severe: percs slowly.	Severe: seepage.	Slight---	Slight---	Poor: small stones.
Continental---	Severe: percs slowly.	Moderate: slope.	Slight---	Slight---	Poor: hard to pack.
Cave---	Severe: cemented pan.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 10.--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
39*:					
Eba	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
Nickel	Moderate: slope.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
Cave	Severe: cemented pan.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
40*:					
Eba	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
Pinaleno	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
41*:					
Eba	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Pinaleno	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
42*:					
Eba	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
Pinaleno	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
43*:					
Eba	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Pinaleno	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
44 Ebon	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
45 Ebon	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
46*:					
Ebon	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
Contine	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
47*:					
Ebon	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
Gunsight	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.

See footnote at end of table.

TABLE 10.--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
47*:					
Cipriano	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
48*:					
Ebon	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
Pinamt	Moderate: slope, large stones.	Severe: seepage, slope.	Moderate: slope, large stones.	Moderate: slope.	Poor: small stones.
49*:					
Ebon	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Pinamt	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
50*:					
Estrella, Calcareous	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Estrella, Noncalcareous	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
51*:					
Gachado	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Lomitas	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
52*:					
Gachado	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Lomitas	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
53--- Gadsden	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Poor: hard to pack.
54*:					
Gila, Noncalcareous	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Fair: small stones.
Gila, Calcareous	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Fair: small stones.

See footnote at end of table.

TABLE 10.--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
55*, 56*:					
Gilman, Noncalcareous	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Gilman, Calcareous	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
57--- Gilman	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
58*, 59*:					
Gilman	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Momoli	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	Poor: seepage, too sandy, small stones.
Denure	Slight	Severe: seepage.	Slight	Slight	Good.
60*:					
Glenbar, Noncalcareous	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Glenbar, Calcareous	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
61*, 62*:					
Gran	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Wickenburg	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
63*, 64*:					
Gran	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Wickenburg	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
65*:					
Greyeagle	Severe: cemented pan, poor filter, slope.	Severe: seepage, cemented pan.	Severe: cemented pan, slope, large stones.	Severe: cemented pan, slope.	Poor: area reclaim, seepage, small stones.
Continental	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Poor: hard to pack.
Nickel	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.

See footnote at end of table.

TABLE 10.--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
66*: Greyeagle	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan.	Severe: cemented pan, large stones.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
Suncity Variant	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
67--- Guest	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Poor: hard to pack.
68*, 69*: Gunsight	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Poor: small stones.
Cipriano	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
70*: Gunsight	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
Rillito	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
71*: Gunsight	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Rillito	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
72*, 73*: Lehmans	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Rock outcrop.					
74*: Luke	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
Cipriano	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
75--- Mohall	Severe: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
76--- Mohall	Severe: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
77--- Mohall	Severe: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
78--- Mohall	Severe: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.

See footnote at end of table.

TABLE 10.--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
79---------- Mohall	Severe: percs slowly.	Moderate: seepage.	Slight----------	Slight----------	Good.
80*, 81*: Mohall----------	Severe: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
Tremant----------	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Fair: small stones.
82, 83---------- Mohave	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Fair: thin layer.
84---------- Mohave	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Good.
85---------- Mohave	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Fair: thin layer.
86---------- Mohave	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Good.
87*: Mohave---------- Noncalcareous	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Fair: thin layer.
Mohave---------- Calcareous	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Good.
88*: Mohave----------	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Fair: thin layer.
Guest----------	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Poor: hard to pack.
89*: Mohave----------	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Fair: thin layer.
Tres Hermanos------	Severe: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Poor: small stones.
90---------- Momoli	Slight----------	Slight----------	Slight----------	Slight----------	Poor: small stones.
91*: Momoli----------	Slight----------	Slight----------	Slight----------	Slight----------	Poor: small stones.
Carrizo----------	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight----------	Poor: seepage, too sandy.
92*: Momoli----------	Slight----------	Slight----------	Slight----------	Slight----------	Poor: small stones.

See footnote at end of table.

TABLE 10.--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
92*: Carrizo	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
93*, 94*: Nickel	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Cave	Severe: cemented pan, slope.	Severe: seepage, cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Poor: area reclaim, small stones, slope.
95--- Ohaco	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
96*, 97*: Pinaleno	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Tres Hermanos	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Poor: small stones.
98*, 99*: Pinamt	Moderate: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
Tremant	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
100*: Quilotosa	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.
Vaiva	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
101--- Rillito	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
102--- Rillito	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
103*: Rock outcrop.					
Gachado	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
104*, 105*: Rock outcrop.					

See footnote at end of table.

TABLE 10.--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
104*, 105*: Lehmans	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
106*, 107*: Sal	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan, excess salt.	Severe: cemented pan.	Poor: area reclaim, small stones.
Cipriano	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
108*: Schenco	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Rock outcrop.					
109*: Schenco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
110*: Suncity	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
Cipriano	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
111. Torriorthents					
112*, 113*, 114*: Tremant Calcareous	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
Tremant Noncalcareous	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
115*: Tremant	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Antho	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
116*, 117*: Tremant	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Gunsight	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Poor: small stones.

See footnote at end of table.

TABLE 10.--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
116*, 117*: Rillito	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
118*: Tremant	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
Rillito	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
119*: Tremant	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Suncity	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
120*: Tres Hermanos Noncalcareous	Severe: percs slowly.	Moderate: seepage.	Slight	Slight	Poor: small stones.
Tres Hermanos Calcareous	Severe: percs slowly.	Moderate: seepage.	Slight	Slight	Poor: small stones.
121*: Tres Hermanos	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Poor: small stones.
Anthony	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
122 Vado	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
123 Vaiva	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
124*: Valencia Calcareous	Severe: percs slowly.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Valencia Noncalcareous	Severe: percs slowly.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Good.
125 Vint	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding, too sandy.	Moderate: flooding.	Fair: too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1*:				
Antho---------- Noncalcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Antho---------- Calcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
2*:				
Antho---------- Noncalcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Antho---------- Calcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
3*:				
Antho----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Carrizo----------	Good----------	Probable----------	Probable----------	Poor: too sandy, small stones, area reclaim.
Maripo----------	Good----------	Probable----------	Probable----------	Poor: area reclaim.
4*:				
Antho----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Carrizo----------	Good----------	Probable----------	Probable----------	Poor: too sandy, small stones, area reclaim.
Maripo----------	Good----------	Probable----------	Probable----------	Poor: area reclaim.
5---------- Anthony	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
6*, 7*:				
Anthony----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Arizo----------	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
8---------- Arizo	Fair: large stones.	Probable----------	Probable----------	Poor: small stones, area reclaim.
9*:				
Beeline----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Cipriano----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
10*, 11*: Brios	Good	Probable	Improbable: too sandy.	Fair: too sandy, small stones, area reclaim.
Carrizo	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
12 Carefree	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
13*: Carefree	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, large stones, area reclaim.
Beardsley	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, thin layer.
14 Carrizo	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
15*: Carrizo	Good	Probable	Probable	Fair: small stones.
Gunsight	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
16*, 17*: Cellar	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
18*: Cherioni	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
19*, 20*: Chuckawalla	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Gunsight	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
21 Cipriano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
22, 23 Contine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
24---------- Continental	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
25---------- Continental	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
26---------- Continental	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
27*: Continental----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Mohave----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
28*: Continental----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Ohaco----------	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
29*, 30*: Denure----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Momoli----------	Good----------	Improbable:---------- excess fines.	Improbable:---------- excess fines.	Poor: small stones, area reclaim.
Carrizo----------	Good----------	Probable----------	Probable----------	Fair: small stones.
31*, 32*: Dixaleta----------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
33, 34, 35---------- Eba	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
36*: Eba----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Continental----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
37*, 38*: Eba----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
37*, 38*: Continental	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Cave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
39*: Eba	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Nickel	Good	Probable	Probable	Poor: small stones, area reclaim.
Cave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
40*: Eba	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Pinaleno	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
41*: Eba	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pinaleno	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
42*: Eba	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Pinaleno	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
43*: Eba	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pinaleno	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
44, 45 Ebon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
46*: Ebon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
46*:				
Contine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
47*:				
Ebon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Gunsight	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Cipriano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
48*:				
Ebon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Pinamt	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
49*:				
Ebon	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pinamt	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
50*:				
Estrella Calcareous	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
Estrella Noncalcareous	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
51*:				
Gachado	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Lomitas	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
52*:				
Gachado	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Lomitas	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
53---------- Gadsden	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
54*:				
Gila---------- Noncalcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Gila---------- Calcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
55*, 56*:				
Gilman---------- Noncalcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
Gilman---------- Calcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
57---------- Gilman	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
58*, 59*:				
Gilman----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
Momoli----------	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
Denure----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
60*:				
Glenbar---------- Noncalcareous	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Glenbar---------- Calcareous	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
61*, 62*:				
Gran----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Wickenburg----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
63*, 64*:				
Gran----------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Wickenburg----------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
65*:				
Greyeagle----------	Poor: area reclaim.	Improbable: large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
Continental----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
65*: Nickel	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
66*: Greyeagle	Poor: area reclaim.	Improbable: large stones.	Improbable: large stones.	Poor: area reclaim, small stones.
Suncity Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
67--- Guest	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
68*, 69*: Gunsight	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Cipriano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
70*: Gunsight	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Rillito	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
71*: Gunsight	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rillito	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
72*, 73*: Lehmans	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
74*: Luke	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Cipriano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
75--- Mohall	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
76--- Mohall	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
77---------- Mohall	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
78---------- Mohall	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
79---------- Mohall	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
80*, 81*:				
Mohall----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Tremant----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
82, 83---------- Mohave	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
84---------- Mohave	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
85---------- Mohave	Good----------	Probable----------	Improbable: too sandy.	Poor: too clayey.
86---------- Mohave	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
87*:				
Mohave---------- Noncalcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Mohave---------- Calcareous	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
88*:				
Mohave----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Guest----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
89*:				
Mohave----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Tres Hermanos--------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
90---------- Momoli	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
91*:				
Momoli----------	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
Carrizo----------	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
92*:				
Momoli----------	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
92*:				
Carrizo	Good	Probable	Probable	Poor: small stones, area reclaim.
93*, 94*:				
Nickel	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Cave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
95	Poor:	Improbable:	Improbable:	Poor:
Ohaco	area reclaim, low strength, shrink-swell.	excess fines.	excess fines.	thin layer.
96*, 97*:				
Pinaleno	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Tres Hermanos	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
98*, 99*:				
Pinamt	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Tremant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
100*:				
Quilotosa	Poor: area reclaim, slope.	Improbable: small stones.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
Vaiva	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
101, 102	Good	Improbable:	Improbable:	Poor:
Rillito		excess fines.	excess fines.	small stones.
103*:				
Rock outcrop.				
Gachado	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
104*, 105*:				
Rock outcrop.				
Lehmans	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
106*, 107*:				
Sal	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Cipriano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
108*:				
Schenco	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Rock outcrop.				
109*:				
Schenco	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
110*:				
Suncity	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Cipriano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
111. Torriorthents				
112*, 113*, 114*:				
Tremant Calcareous	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Tremant Noncalcareous	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
115*:				
Tremant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Antho	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
116*, 117*:				
Tremant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Gunsight	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Rillito	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
118*:				
Tremant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Rillito	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
119*:				
Tremant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Suncity	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
120*:				
Tres Hermanos Noncalcareous	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Tres Hermanos Calcareous	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
121*:				
Tres Hermanos	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Anthony	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
122 Vado	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
123 Vaiva	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
124*:				
Valencia Noncalcareous	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Valencia Calcareous	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
125 Vint	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--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]

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
1*:				
Antho---------- Noncalcareous	Severe: seepage.	Severe: seepage, piping.	Droughty----------	Favorable.
Antho---------- Calcareous	Severe: seepage.	Severe: seepage, piping.	Droughty----------	Favorable.
2*:				
Antho---------- Noncalcareous	Severe: seepage.	Severe: seepage, piping.	Droughty----------	Favorable.
Antho---------- Calcareous	Severe: seepage.	Severe: seepage, piping.	Droughty----------	Favorable.
3*:				
Antho----------	Severe: seepage.	Severe: seepage, piping.	Droughty----------	Favorable.
Carrizo----------	Severe: seepage.	Severe: seepage.	Droughty, fast intake.	Large stones, too sandy.
Maripo----------	Severe: seepage.	Severe: seepage.	Droughty----------	Too sandy.
4*:				
Antho----------	Severe: seepage.	Severe: seepage, piping.	Droughty----------	Favorable.
Carrizo----------	Severe: seepage.	Severe: seepage.	Droughty, fast intake.	Large stones, too sandy.
Maripo----------	Severe: seepage.	Severe: seepage.	Droughty----------	Too sandy.
5---------- Anthony	Severe: seepage.	Severe: piping.	Favorable----------	Favorable.
6*, 7*:				
Anthony----------	Severe: seepage.	Severe: piping.	Favorable----------	Favorable.
Arizo----------	Severe: seepage.	Severe: seepage.	Droughty----------	Large stones, too sandy.
8---------- Arizo	Severe: seepage.	Severe: seepage.	Large stones, droughty.	Large stones, too sandy.
9*:				
Beeline----------	Severe: depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock.
Cipriano----------	Severe: cemented pan, slope.	Slight----------	Droughty, cemented pan, slope.	Slope, cemented pan.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
10*, 11*: Brios	Severe: seepage.	Severe: seepage.	Droughty, fast intake.	Too sandy.
Carrizo	Severe: seepage.	Severe: seepage.	Droughty, fast intake, slope.	Large stones, too sandy.
12--- Carefree	Moderate: slope.	Moderate: hard to pack, large stones.	Large stones, percs slowly.	Large stones, percs slowly.
13*: Carefree	Slight---	Moderate: hard to pack, large stones.	Large stones, slow intake, percs slowly.	Large stones, percs slowly.
Beardsley	Moderate: cemented pan.	Moderate: thin layer.	Percs slowly, cemented pan.	Cemented pan, percs slowly.
14--- Carrizo	Severe: seepage.	Severe: seepage.	Droughty, fast intake.	Large stones, too sandy.
15*: Carrizo	Severe: seepage.	Severe: seepage.	Droughty---	Too sandy.
Gunsight	Moderate: seepage, slope.	Severe: seepage.	Droughty, slope.	Favorable.
16*, 17*: Cellar	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Rock outcrop.				
18*: Cherioni	Severe: depth to rock, cemented pan, slope.	Severe: thin layer.	Droughty, depth to rock, cemented pan.	Slope, large stones, depth to rock.
Rock outcrop.				
19*, 20*: Chuckawalla	Severe: seepage.	Severe: seepage, excess salt.	Droughty, excess salt.	Too sandy.
Gunsight	Moderate: seepage, slope.	Severe: seepage.	Droughty, slope.	Favorable.
21--- Cipriano	Severe: cemented pan.	Slight---	Droughty, cemented pan.	Cemented pan.
22--- Contine	Slight---	Moderate: hard to pack.	Percs slowly---	Percs slowly.
23--- Contine	Slight---	Moderate: hard to pack.	Slow intake, percs slowly.	Percs slowly.
24--- Continental	Slight---	Moderate: hard to pack.	Percs slowly---	Percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
25---------- Continental	Slight----------	Moderate: hard to pack.	Slow intake, percs slowly.	Percs slowly.
26---------- Continental	Moderate: slope.	Moderate: hard to pack.	Percs slowly, slope.	Percs slowly.
27*: Continental------	Slight----------	Moderate: hard to pack.	Percs slowly----------	Percs slowly.
Mohave----------	Moderate: seepage.	Moderate: thin layer.	Favorable----------	Favorable.
28*: Continental------	Slight----------	Moderate: hard to pack.	Percs slowly----------	Percs slowly.
Ohaco----------	Moderate: seepage, cemented pan.	Severe: thin layer.	Percs slowly, cemented pan.	Cemented pan, percs slowly.
29*, 30*: Denure----------	Moderate: seepage.	Severe: piping.	Droughty----------	Favorable.
Momoli----------	Severe: seepage.	Severe: seepage.	Droughty----------	Favorable.
Carrizo----------	Severe: seepage.	Severe: seepage.	Droughty----------	Too sandy.
31*, 32*: Dixaleta---------	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, depth to rock.
Rock outcrop.				
33---------- Eba	Severe: seepage.	Moderate: thin layer.	Droughty, percs slowly, slope.	Percs slowly.
34, 35---------- Eba	Severe: seepage, slope.	Moderate: thin layer.	Droughty, percs slowly, slope.	Slope, percs slowly.
36*: Eba----------	Severe: seepage.	Moderate: thin layer.	Droughty, percs slowly, slope.	Percs slowly.
Continental------	Moderate: slope.	Moderate: hard to pack.	Percs slowly, slope.	Percs slowly.
37*, 38*: Eba----------	Severe: seepage.	Moderate: thin layer.	Droughty, percs slowly, slope.	Percs slowly.
Continental------	Moderate: slope.	Moderate: hard to pack.	Percs slowly, slope.	Percs slowly.
Cave----------	Severe: seepage, cemented pan, slope.	Severe: seepage.	Droughty, cemented pan, slope.	Slope, cemented pan, too sandy.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
39*:				
Eba	Severe: seepage.	Moderate: thin layer.	Droughty, percs slowly, slope.	Percs slowly.
Nickel	Severe: seepage, slope.	Severe: seepage.	Droughty, slope.	Slope.
Cave	Severe: seepage, cemented pan, slope.	Severe: seepage.	Droughty, cemented pan, slope.	Slope, cemented pan, too sandy.
40*, 41*, 42*, 43*:				
Eba	Severe: seepage, slope.	Moderate: thin layer.	Droughty, percs slowly, slope.	Slope, percs slowly.
Pinaleno	Severe: slope.	Severe: piping.	Slope	Slope.
44 Ebon	Moderate: seepage, slope.	Moderate: thin layer.	Droughty, percs slowly, slope.	Percs slowly.
45 Ebon	Severe: slope.	Moderate: thin layer.	Droughty, percs slowly, slope.	Slope, percs slowly.
46*:				
Ebon	Moderate: seepage, slope.	Moderate: thin layer.	Droughty, percs slowly, slope.	Percs slowly.
Contine	Moderate: slope.	Moderate: hard to pack.	Percs slowly, slope.	Percs slowly.
47*:				
Ebon	Moderate: seepage, slope.	Moderate: thin layer.	Droughty, percs slowly, slope.	Percs slowly.
Gunsight	Severe: slope.	Severe: seepage.	Droughty, slope.	Slope.
Cipriano	Severe: cemented pan, slope.	Slight	Droughty, cemented pan, slope.	Slope, cemented pan.
48*, 49*:				
Ebon	Severe: slope.	Moderate: thin layer.	Droughty, percs slowly, slope.	Slope, percs slowly.
Pinamt	Severe: seepage, slope.	Moderate: large stones.	Large stones, droughty, slope.	Slope, large stones.
50*:				
Estrella Calcareous	Moderate: seepage, slope.	Moderate: piping.	Favorable	Favorable.
Estrella Noncalcareous	Moderate: seepage, slope.	Moderate: piping.	Favorable	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
51*:				
Gachado	Severe: depth to rock, slope.	Severe: thin layer.	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
Lomitas	Severe: depth to rock, slope.	Severe: seepage.	Droughty, depth to rock.	Slope, large stones, depth to rock.
52*:				
Gachado	Severe: depth to rock, slope.	Severe: thin layer.	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
Lomitas	Severe: depth to rock, slope.	Severe: seepage.	Droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.				
53--- Gadsden	Slight	Moderate: hard to pack.	Slow intake, percs slowly.	Percs slowly.
54*:				
Gila Noncalcareous	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
Gila Calcareous	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
55*, 56*:				
Gilman Noncalcareous	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
Gilman Calcareous	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
57--- Gilman	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
58*, 59*:				
Gilman	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
Momoli	Severe: seepage.	Severe: seepage.	Droughty	Too sandy.
Denure	Moderate: seepage.	Severe: piping.	Droughty	Favorable.
60*:				
Glenbar Noncalcareous	Slight	Slight	Favorable	Erodes easily.
Glenbar Calcareous	Slight	Slight	Favorable	Erodes easily.
61*, 62*:				
Gran	Moderate: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Depth to rock.
Wickenburg	Severe: depth to rock.	Severe: thin layer.	Droughty, depth to rock, slope.	Depth to rock.
63*, 64*:				
Gran	Severe: slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
63*, 64*: Wickenburg	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, depth to rock.
Rock outcrop.				
65*: Greyeagle	Severe: seepage, cemented pan, slope.	Severe: seepage, large stones.	Large stones, droughty, cemented pan.	Slope, large stones, cemented pan.
Continental	Slight	Moderate: hard to pack.	Percs slowly	Percs slowly.
Nickel	Severe: seepage, slope.	Severe: seepage.	Droughty, slope.	Slope.
66*: Greyeagle	Severe: seepage, cemented pan.	Severe: seepage, large stones.	Large stones, droughty, cemented pan.	Large stones, cemented pan.
Suncity Variant	Severe: cemented pan.	Severe: thin layer.	Cemented pan, slope.	Cemented pan.
67 Guest	Slight	Moderate: hard to pack.	Slow intake, percs slowly.	Percs slowly.
68*, 69*: Gunsight	Moderate: seepage, slope.	Severe: seepage.	Droughty, slope.	Favorable.
Cipriano	Severe: cemented pan.	Slight	Droughty, cemented pan, slope.	Cemented pan.
70*, 71*: Gunsight	Severe: slope.	Severe: seepage.	Droughty, slope.	Slope.
Rillito	Severe: slope.	Moderate: seepage.	Droughty, slope.	Slope, erodes easily.
72*, 73*: Lehmans	Severe: depth to rock, slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Rock outcrop.				
74*: Luke	Moderate: cemented pan, slope.	Severe: thin layer.	Droughty, percs slowly, cemented pan.	Cemented pan, erodes easily, percs slowly.
Cipriano	Severe: cemented pan, slope.	Slight	Droughty, cemented pan, slope.	Slope, cemented pan.
75, 76, 77, 78 Mohall	Moderate: seepage.	Moderate: seepage.	Favorable	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
79---------- Mohall	Moderate: seepage.	Moderate: seepage.	Slow intake, percs slowly.	Favorable.
80*, 81*: Mohall----------	Moderate: seepage, slope.	Moderate: seepage.	Slope----------	Favorable.
Tremant----------	Moderate: seepage, slope.	Severe: piping.	Slope----------	Favorable.
82---------- Mohave	Moderate: seepage.	Moderate: thin layer.	Favorable----------	Favorable.
83---------- Mohave	Moderate: seepage.	Moderate: thin layer.	Favorable----------	Favorable.
84---------- Mohave	Moderate: seepage.	Severe: piping.	Favorable----------	Erodes easily.
85---------- Mohave	Moderate: seepage.	Moderate: thin layer.	Slow intake, percs slowly.	Favorable.
86---------- Mohave	Moderate: seepage.	Severe: piping.	Favorable----------	Favorable.
87*: Mohave---------- Noncalcareous	Moderate: seepage.	Moderate: thin layer.	Favorable----------	Favorable.
Mohave---------- Calcareous	Moderate: seepage.	Severe: piping.	Favorable----------	Favorable.
88*: Mohave----------	Moderate: seepage.	Moderate: thin layer.	Favorable----------	Favorable.
Guest----------	Slight----------	Moderate: hard to pack.	Percs slowly----------	Erodes easily, percs slowly.
89*: Mohave----------	Moderate: seepage, slope.	Moderate: thin layer.	Slope----------	Erodes easily.
Tres Hermanos----	Moderate: seepage, slope.	Severe: seepage.	Droughty, slope.	Favorable.
90---------- Momoli	Severe: seepage.	Severe: seepage.	Droughty, slope.	Too sandy.
91*: Momoli----------	Severe: seepage.	Severe: seepage.	Droughty----------	Too sandy.
Carrizo----------	Severe: seepage.	Severe: seepage.	Droughty----------	Too sandy.
92*: Momoli----------	Severe: seepage.	Severe: seepage.	Droughty----------	Too sandy.
Carrizo----------	Severe: seepage.	Severe: seepage.	Droughty----------	Large stones, too sandy.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
93*, 94*: Nickel	Severe: seepage, slope.	Severe: seepage.	Droughty, slope.	Slope.
Cave	Severe: seepage, cemented pan, slope.	Severe: seepage.	Droughty, cemented pan, slope.	Slope, cemented pan, too sandy.
95--- Ohaco	Moderate: seepage, cemented pan.	Severe: thin layer.	Percs slowly, cemented pan.	Cemented pan, percs slowly.
96*, 97*: Pinaleno	Moderate: seepage, slope.	Severe: piping.	Slope	Favorable.
Tres Hermanos	Moderate: seepage, slope.	Severe: seepage.	Droughty, slope.	Favorable.
98*, 99*: Pinamt	Severe: seepage.	Moderate: large stones.	Large stones, droughty, slope.	Large stones.
Tremant	Moderate: seepage, slope.	Severe: piping.	Slope	Favorable.
100*: Quilotosa	Severe: depth to rock, slope.	Severe: seepage.	Droughty, depth to rock, slope.	Slope, depth to rock.
Vaiva	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, depth to rock.
Rock outcrop.				
101--- Rillito	Moderate: seepage.	Moderate: seepage.	Droughty	Erodes easily.
102--- Rillito	Moderate: seepage, slope.	Moderate: seepage.	Droughty, slope.	Erodes easily.
103*: Rock outcrop.				
Gachado	Severe: depth to rock, slope.	Severe: thin layer.	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
104*, 105*: Rock outcrop.				
Lehmans	Severe: depth to rock, slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
106*, 107*: Sal	Severe: cemented pan.	Severe: excess salt.	Droughty, cemented pan.	Cemented pan.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
106*, 107*: Cipriano	Severe: cemented pan.	Slight	Droughty, cemented pan, slope.	Cemented pan.
108*, 109*: Schenco	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, depth to rock.
Rock outcrop.				
110*: Suncity	Severe: cemented pan.	Severe: thin layer.	Droughty, percs slowly, cemented pan.	Cemented pan, erodes easily, percs slowly.
Cipriano	Severe: cemented pan.	Slight	Droughty, cemented pan, slope.	Cemented pan.
111. Torriorthents				
112*, 113*, 114*: Tremant Calcareous	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
Tremant Noncalcareous	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
115*: Tremant	Moderate: seepage, slope.	Severe: piping.	Slope	Favorable.
Antho	Severe: seepage.	Severe: seepage, piping.	Droughty, slope.	Favorable.
116*, 117*: Tremant	Moderate: seepage, slope.	Severe: piping.	Slope	Favorable.
Gunsight	Moderate: seepage, slope.	Severe: seepage.	Droughty, slope.	Favorable.
Rillito	Moderate: seepage, slope.	Moderate: seepage.	Droughty, slope.	Erodes easily.
118*: Tremant	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
Rillito	Moderate: seepage.	Moderate: seepage.	Droughty	Erodes easily.
119*: Tremant	Moderate: seepage, slope.	Severe: piping.	Slope	Favorable.
Suncity	Severe: cemented pan.	Severe: thin layer.	Droughty, percs slowly, cemented pan.	Cemented pan, erodes easily, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
120*:				
Tres Hermanos---- Noncalcareous	Moderate: seepage.	Severe: seepage.	Droughty----------	Favorable.
Tres Hermanos---- Calcareous	Moderate: seepage.	Severe: seepage.	Droughty----------	Favorable.
121*:				
Tres Hermanos----	Moderate: seepage, slope.	Severe: seepage.	Droughty, slope.	Favorable.
Anthony----------	Severe: seepage.	Severe: piping.	Slope----------	Favorable.
122---------- Vado	Severe: seepage.	Severe: seepage.	Droughty, slope.	Favorable.
123---------- Vaiva	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, depth to rock.
124*:				
Valencia--------- Noncalcareous	Severe: seepage.	Severe: thin layer.	Favorable----------	Favorable.
Valencia--------- Calcareous	Severe: seepage.	Severe: thin layer.	Favorable----------	Favorable.
125---------- Vint	Severe: seepage.	Severe: piping.	Droughty, fast intake.	Too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1*:											
Antho---------- Noncalcareous	0-3	Sandy loam-------	SM	A-2, A-2	0	100	95-100	60-70	30-40	15-20	NP-5
	3-60	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0	70-100	65-95	35-60	15-40	15-20	NP-5
Antho---------- Calcareous	0-3	Sandy loam-------	SM	A-2, A-2	0	100	95-100	60-70	30-40	15-20	NP-5
	3-60	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0	70-100	65-95	35-60	15-40	15-20	NP-5
2*:											
Antho---------- Noncalcareous	0-3	Gravelly sandy loam.	SM	A-2	0	70-85	60-75	35-50	20-30	15-20	NP-5
	3-60	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-1, A-2, A-4	0	70-100	65-95	35-60	15-40	15-20	NP-5
Antho---------- Calcareous	0-3	Gravelly sandy loam.	SM	A-2	0	70-85	60-75	35-50	20-30	15-20	NP-5
	3-60	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-1, A-2, A-4	0	70-100	65-95	35-60	15-40	15-20	NP-5
3*:											
Antho----------	0-3	Sandy loam-------	SM	A-2, A-2	0	100	95-100	60-70	30-40	15-20	NP-5
	3-60	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0	70-100	65-95	35-60	15-40	15-20	NP-5
Carrizo---------	0-28	Very gravelly sand.	GM, GP, SM, SP	A-1	0-10	30-65	15-50	5-35	0-15	---	NP
	28-60	Gravelly coarse sand, very gravelly coarse sand, very gravelly sand.	GP, GM, SP, SM	A-1	0-25	30-65	15-60	5-35	0-15	---	NP
Maripo----------	0-18	Sandy loam-------	SM	A-2, A-4	0	100	95-100	60-70	30-40	15-20	NP-5
	18-29	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	85-95	55-75	30-45	15-20	NP-5
	29-60	Gravelly sand, gravelly loamy sand, very gravelly loamy sand.	SP-SM, SM	A-1	0	65-80	40-75	30-50	5-20	---	NP
4*:											
Antho----------	0-3	Sandy loam-------	SM	A-2, A-2	0	100	95-100	60-70	30-40	15-20	NP-5
	3-60	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0	70-100	65-95	35-60	15-40	15-20	NP-5
Carrizo---------	0-10	Very gravelly sand.	GP, GM, SP, SM	A-1	0-10	35-65	15-50	5-35	0-15	---	NP
	10-60	Extremely gravelly coarse sand, very gravelly coarse sand, very gravelly sand.	GP, GM, SP, SM	A-1	0-25	30-65	15-60	5-35	0-15	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
4*:											
Maripo----------	0-18	Sandy loam-------	SM	A-2, A-4	0	100	95-100	60-70	30-40	15-20	NP-5
	18-29	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	85-95	55-75	30-45	15-20	NP-5
	29-60	Gravelly sand, gravelly loamy sand, very gravelly loamy sand.	SP-SM, SM	A-1	0	65-80	40-75	30-50	5-20	---	NP
5----------	0-2	Sandy loam-------	SM, ML	A-4	0	95-100	90-100	55-85	35-65	20-30	NP-5
Anthony	2-40	Very gravelly sandy loam, gravelly sandy loam.	GM, SM	A-1, A-2	15-25	45-65	40-60	25-35	10-30	---	NP
	40-60	Loam----------	CL-ML, ML	A-4	0	100	100	95-100	70-80	20-30	NP-10
6*, 7*:											
Anthony---------	0-2	Sandy loam-------	SM, ML	A-4	0	95-100	90-100	55-85	35-65	20-30	NP-5
	2-40	Very gravelly sandy loam, gravelly sandy loam.	GM, SM	A-1, A-2	15-25	45-65	40-60	25-35	10-30	---	NP
	40-60	Loam----------	CL-ML, ML	A-4	0	100	100	95-100	70-80	20-30	NP-10
Arizo----------	0-1	Gravelly sandy loam.	SM	A-2	0	75-85	65-75	40-50	20-30	15-20	NP-5
	1-8	Very gravelly sandy loam.	SM, GM	A-2	0-5	45-60	35-50	25-35	10-20	15-20	NP-5
	8-60	Very gravelly loamy sand, very cobbly loamy sand.	GM, GP-GM, SM, SP-SM	A-1	25-30	50-60	40-55	20-40	10-15	---	NP
8----------	0-1	Cobbly sandy loam	SM	A-2	25-35	90-95	85-90	50-60	25-35	15-20	NP-5
Arizo	1-8	Very cobbly sandy loam.	SM	A-2	35-50	90-95	85-90	50-60	25-35	15-20	NP-5
	8-60	Very gravelly loamy sand, very cobbly loamy sand.	GM, GP-GM, SM, SP-SM	A-1	25-30	50-60	40-55	20-40	10-15	---	NP
9*:											
Beeline---------	0-1	Gravelly sandy loam.	SM	A-2, A-1	0	70-85	60-75	35-50	20-30	20-25	NP-5
	1-9	Sandy loam, loam, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	95-100	90-95	60-80	30-55	20-30	NP-10
	9-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cipriano--------	0-6	Very gravelly loam.	GM-GC	A-2	5-10	45-60	40-50	35-50	20-35	20-30	5-10
	6	Indurated--------	---	---	---	---	---	---	---	---	---
10*, 11*:											
Brios----------	0-2	Loamy sand-------	SM	A-2	0	100	100	50-75	15-30	---	NP
	2-60	Stratified gravelly coarse sand to fine sandy loam.	SP-SM, SM	A-1, A-2, A-3	0	75-95	70-90	40-60	5-20	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
10*, 11*---------											
Carrizo	0-2	Very gravelly sand.	GM, GP, SM, SP	A-1	0-10	30-65	15-50	5-35	0-15	---	NP
	2-60	Gravelly coarse sand, very gravelly coarse sand, very gravelly sand.	GP, GM, SP, SM	A-1	0-25	30-65	15-60	5-35	0-15	---	NP
12---------------	0-1	Cobbly clay loam	ML, CL	A-6, A-7	25-40	90-95	85-90	75-90	60-70	35-45	10-20
Carefree	1-50	Clay, silty clay	CH, CL	A-7	0-25	100	95-100	85-95	70-95	45-60	20-30
	50-60	Very cobbly clay, very cobbly silty clay, very cobbly clay loam.	ML, CL, GC, GM	A-7	50-60	65-75	60-70	55-70	45-65	40-55	15-25
13*:											
Carefree--------	0-1	Cobbly clay------	CH, CL	A-7	25-40	90-95	85-90	75-90	65-85	45-60	20-30
	1-50	Clay, silty clay	CH, CL	A-7	0-25	100	95-100	85-95	70-95	45-60	20-30
	50-60	Very cobbly clay, very cobbly silty clay, very cobbly clay loam.	ML, CL, GC, GM	A-7	50-60	65-75	60-70	55-70	45-65	40-55	15-25
Beardsley-------	0-2	Cobbly clay loam	CL	A-6	25-40	95-100	90-95	75-85	55-70	30-35	10-15
	2-36	Clay, clay loam	CL	A-7	0-5	100	100	80-90	70-80	40-50	15-25
	36-42	Indurated--------	---	---	---	---	---	---	---	---	---
14---------------	0-1	Very gravelly sand.	GM, GP, SM, SP	A-1	0-10	35-65	15-50	5-35	0-15	---	NP
Carrizo	1-60	Gravelly coarse sand, very gravelly coarse sand, very gravelly sand.	GP, GM, SP, SM	A-1	0-25	30-65	15-60	5-35	0-15	---	NP
15*:											
Carrizo---------	0-5	Gravelly sandy loam.	SM	A-2, A-1	0-5	70-85	60-75	35-50	20-30	15-20	NP-5
	5-60	Very gravelly loamy sand, extremely gravelly sand, very gravelly sand.	GP	A-1	0-5	30-60	20-50	10-30	0-5	---	NP
Gunsight--------	0-1	Very gravelly sandy loam.	GM	A-1	0-10	35-55	20-50	15-30	10-20	15-20	NP-5
	1-60	Very gravelly loam, very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-10	35-55	30-50	25-50	10-30	15-25	NP-10
16*, 17*:											
Cellar----------	0-3	Very gravelly fine sandy loam.	GM	A-1, A-2	0-20	35-60	20-50	20-40	15-25	20-25	NP-5
	3-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
18*:											
Cherioni--------	0-1	Extremely stony loam.	GM-GC, GM	A-2, A-1	40-60	35-45	30-40	25-40	15-30	20-30	NP-10
	1-10	Very gravelly very fine sandy loam, extremely gravelly loam, very gravelly sandy loam.	GM, SM, GP-GM, SP-SM	A-1	5-15	30-60	25-50	15-25	5-15	10-25	NP-5
	10-13	Indurated--------	---	---	---	---	---	---	---	---	---
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
19*:											
Chuckawalla-----	0-2	Extremely gravelly loam.	GM-GC	A-1, A-2	0-5	30-60	20-50	15-45	10-35	20-30	5-10
	2-14	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GM-GC, GM	A-1, A-2	0-5	30-60	20-50	15-45	10-35	25-35	5-10
	14-60	Very gravelly sandy loam, extremely gravelly sandy loam.	GP-GM, GM, SP-SM, SM	A-1	0-5	30-60	20-50	10-35	5-20	15-25	NP-5
Gunsight--------	0-3	Very gravelly loam.	GM-GC, GP-GC	A-2, A-1	0-10	35-55	30-50	25-50	10-35	20-30	5-10
	3-60	Very gravelly loam, very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-10	35-55	30-50	25-50	10-30	15-25	NP-10
20*:											
Chuckawalla-----	0-2	Extremely gravelly loam.	GM-GC	A-1, A-2	0-5	30-60	20-50	15-45	10-35	20-30	5-10
	2-14	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GM-GC, GM	A-1, A-2	0-5	30-60	20-50	15-45	10-35	25-35	5-10
	14-60	Very gravelly sandy loam, extremely gravelly sandy loam.	GP-GM, GM, SP-SM, SM	A-1	0-5	30-60	20-50	10-35	5-20	15-25	NP-5
Gunsight--------	0-3	Very gravelly loam.	GM-GC, GP-GC	A-2, A-1	0-10	35-55	30-50	25-50	10-35	20-30	5-10
	3-60	Very gravelly loam, very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-10	35-55	30-50	25-50	10-30	15-25	NP-10
21---------- Cipriano	0-6	Very gravelly loam.	GM-GC	A-2	5-10	45-60	40-50	35-50	20-35	20-30	5-10
	6	Indurated--------	---	---	---	---	---	---	---	---	---
22---------- Contine	0-2	Clay loam--------	CL	A-7	0	100	100	90-100	70-85	40-50	15-25
	2-30	Clay, clay loam, sandy clay.	CL, CH	A-7	0	100	100	85-95	50-70	40-55	20-30
	30-60	Sandy loam-------	SM	A-2, A-4	0	90-100	85-95	50-65	25-45	20-25	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
23---------- Contine	0-12	Clay----------	CL	A-7	0	100	100	90-100	70-85	40-50	15-25
	12-26	Clay, clay loam, sandy clay.	CL, CH	A-7	0	100	100	85-95	50-70	40-55	20-30
	26-60	Clay loam, sandy clay, gravelly clay.	CL	A-6, A-7	0	80-100	70-100	65-95	55-80	35-50	15-25
24---------- Continental	0-1	Clay loam--------	CL, CL-ML	A-4, A-6	0	90-100	85-95	75-90	55-70	25-40	5-15
	1-60	Clay----------	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
25---------- Continental	0-1	Clay----------	CL, CH	A-7	0	90-100	85-95	80-90	70-85	45-55	20-30
	1-60	Clay----------	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
26---------- Continental	0-2	Cobbly clay loam	CL, ML	A-6	25-30	80-90	75-85	70-80	55-65	35-40	10-15
	2-60	Clay----------	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
27*: Continental-----	0-1	Clay loam--------	CL, CL-ML	A-4, A-6	0	90-100	85-95	75-90	55-70	25-40	5-15
	1-60	Clay----------	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
Mohave----------	0-2	Sandy loam-------	SM, SM-SC	A-2	0	90-100	85-100	55-75	25-45	20-30	NP-10
	2-20	Clay loam, loam	CL, CL-ML	A-6, A-7	0	100	95-100	85-95	70-80	25-45	5-25
	20-60	Loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-95	50-75	20-25	5-10
28*: Continental-----	0-2	Cobbly clay loam	CL, ML	A-6	25-30	80-90	75-85	70-80	55-65	35-40	10-15
	2-60	Clay----------	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
Ohaco----------	0-2	Gravelly loam----	CL-ML, ML, SM-SC, SM	A-4	0-5	70-80	65-75	55-70	40-55	25-35	5-10
	2-27	Clay, clay loam	CL, CH	A-7	0	90-100	90-95	80-90	65-80	40-55	15-30
	27-31	Gravelly sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	0	55-80	50-75	35-55	20-35	20-25	NP-10
	31	Indurated--------	---	---	---	---	---	---	---	---	---
29*, 30*: Denure----------	0-2	Fine sandy loam	SM	A-2, A-4	0	100	95-100	65-90	30-40	20-25	NP-5
	2-60	Gravelly sandy loam, sandy loam.	SM	A-2, A-4	0	80-100	70-95	50-70	30-40	20-25	NP-5
Momoli----------	0-10	Gravelly sandy loam.	SM	A-2, A-1	0-5	65-80	60-75	35-50	20-30	20-30	NP-5
	10-32	Extremely gravelly sandy loam, very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-5	40-65	20-50	15-40	10-35	20-30	NP-10
	32-60	Extremely gravelly sandy loam.	GM	A-1, A-2	0-5	40-50	30-40	20-30	10-15	15-25	NP-5
Carrizo----------	0-10	Gravelly sandy loam.	SM	A-2, A-1	0-5	70-85	60-75	35-50	20-30	15-20	NP-5
	10-23	Very gravelly loamy sand.	GM, SM	A-1	0-5	45-60	35-50	20-40	10-15	---	NP
	23-60	Very gravelly loamy sand, extremely gravelly sand, very gravelly sand.	GP	A-1	0-5	30-60	20-50	10-30	0-5	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
31*, 32*:											
Dixaleta--------	0-1	Extremely channery sandy loam.	GP-GM, GM, GM-GC, GP-GC	A-1, A-2	0	20-40	15-30	10-20	5-15	20-30	NP-10
	1-8	Extremely channery sandy loam, extremely channery loam, extremely channery clay .	GC, GM-GC, GP-GC	A-2	0	20-35	15-25	10-25	5-20	20-35	5-15
	8-27	Weathered bedrock	---	---	---	---	---	---	---	---	---
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
33, 34, 35------- Eba	0-3	Very gravelly loam.	GM-GC, GM	A-2, A-1	5-15	40-60	30-55	25-55	15-35	15-25	NP-10
	3-36	Very gravelly clay, extremely gravelly clay.	GC	A-2, A-7	5-15	35-60	25-50	25-50	20-40	45-55	20-30
	36-60	Extremely gravelly sandy loam.	GM	A-1, A-2	5-15	40-50	30-40	20-30	10-15	15-25	NP-5
36*:											
Eba----------	0-3	Very gravelly loam.	GM-GC, GM	A-2, A-1	5-15	40-60	30-55	25-55	15-35	15-25	NP-10
	3-36	Very gravelly clay, extremely gravelly clay.	GC	A-2, A-7	5-15	35-60	25-50	25-50	20-40	45-55	20-30
	36-60	Extremely gravelly sandy loam.	GM	A-1, A-2	5-15	40-50	30-40	20-30	10-15	15-25	NP-5
Continental-----	0-1	Clay loam--------	CL, CL-ML	A-4, A-6	0	90-100	85-95	75-90	55-70	25-40	5-15
	1-60	Clay----------	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
37*, 38*:											
Eba----------	0-3	Very gravelly loam.	GM-GC, GM	A-2, A-1	5-15	40-60	30-55	25-55	15-35	15-25	NP-10
	3-36	Very gravelly clay, extremely gravelly clay.	GC	A-2, A-7	5-15	35-60	25-50	25-50	20-40	45-55	20-30
	36-60	Extremely gravelly sandy loam.	GM	A-1, A-2	5-15	40-50	30-40	20-30	10-15	15-25	NP-5
Continental-----	0-1	Clay loam--------	CL, CL-ML	A-4, A-6	0	90-100	85-95	75-90	55-70	25-40	5-15
	1-60	Clay----------	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
Cave----------	0-1	Gravelly loam----	SM-SC	A-4	0-5	70-90	60-75	40-65	35-50	25-30	5-10
	1-14	Loam, gravelly loam.	CL-ML, SM-SC	A-4	0-5	75-95	70-90	60-80	40-60	20-25	5-10
	14-20	Indurated--------	---	---	---	---	---	---	---	---	---
	20-60	Gravelly loamy sand, very gravelly sandy loam.	GM, SM	A-1, A-2	0-5	35-75	30-60	20-35	10-30	---	NP
39*:											
Eba----------	0-3	Very gravelly loam.	GM-GC, GM	A-2, A-1	5-15	40-60	30-55	25-55	15-35	15-25	NP-10
	3-36	Very gravelly clay, extremely gravelly clay.	GC	A-2, A-7	5-15	35-60	25-50	25-50	20-40	45-55	20-30
	36-60	Extremely gravelly sandy loam.	GM	A-1, A-2	5-15	40-50	30-40	20-30	10-15	15-25	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
39*:											
Nickel----------	0-1	Gravelly sandy loam.	SM	A-2	0	70-85	60-75	35-50	20-30	15-20	NP-5
	1-10	Gravelly loam, very gravelly loam.	GM-GC, SM-SC	A-2, A-4	0	55-75	45-65	40-60	25-45	20-30	5-10
	10-50	Very gravelly sandy loam.	GM	A-1, A-2	0	45-55	40-50	20-35	10-20	15-20	NP-5
	50-60	Very gravelly loamy sand.	GP-GM	A-1	0	35-45	30-40	15-30	5-10	---	NP
Cave----------	0-1	Gravelly loam----	SM-SC	A-4	0-5	70-90	60-75	40-65	35-50	25-30	5-10
	1-14	Loam, gravelly loam.	CL-ML, SM-SC	A-4	0-5	75-95	70-90	60-80	40-60	20-25	5-10
	14-20	Indurated--------	---	---	---	---	---	---	---	---	---
	20-60	Gravelly loamy sand, very gravelly sandy loam.	GM, SM	A-1, A-2	0-5	35-75	30-60	20-35	10-30	---	NP
40*, 41*, 42*, 43*:											
Eba----------	0-3	Very gravelly loam.	GM-GC, GM	A-2, A-1	5-15	40-60	30-55	25-55	15-35	15-25	NP-10
	3-36	Very gravelly clay, extremely gravelly clay.	GC	A-2, A-7	5-15	35-60	25-50	25-50	20-40	45-55	20-30
	36-60	Extremely gravelly sandy loam.	GM	A-1, A-2	5-15	40-50	30-40	20-30	10-15	15-25	NP-5
Pinaleno-------	0-1	Very gravelly clay loam.	GM, GC	A-2, A-6, A-7	0-10	45-55	40-50	35-50	30-40	35-45	10-20
	1-12	Gravelly clay loam, very gravelly clay loam.	GM, GC	A-2, A-6, A-7	0	50-70	40-60	35-55	30-50	35-45	10-20
	12-60	Loam, gravelly loam.	CL-ML, SM-SC	A-4	0	80-95	70-85	60-80	40-60	20-30	5-10
44, 45---------- Ebon	0-1	Very gravelly loam.	GC, GM-GC	A-2	0	45-55	40-50	30-40	20-35	25-40	5-15
	1-43	Very gravelly sandy clay, very gravelly clay.	GC	A-2	0	45-55	40-50	30-40	20-35	40-55	20-30
	43-60	Gravelly loamy sand, very gravelly loamy sand.	GP-GM, SP-SM	A-1	0	45-55	40-50	25-30	5-10	---	NP
46*:											
Ebon----------	0-1	Very gravelly loam.	GC, GM-GC	A-2	0	45-55	40-50	30-40	20-35	25-40	5-15
	1-43	Very gravelly sandy clay, very gravelly clay.	GC	A-2	0	45-55	40-50	30-40	20-35	40-55	20-30
	43-60	Gravelly loamy sand, very gravelly loamy sand.	GP-GM, SP-SM	A-1	0	45-55	40-50	25-30	5-10	---	NP
Contine---------	0-2	Clay loam--------	CL	A-7	0	100	100	90-100	70-85	40-50	15-25
	2-30	Clay, clay loam, sandy clay.	CL, CH	A-7	0	100	100	85-95	50-70	40-55	20-30
	30-60	Sandy loam-------	SM	A-2, A-4	0	90-100	85-95	50-65	25-45	20-25	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
47*:											
Ebon----------	0-1	Very gravelly clay loam.	GC, GM-GC	A-2	0	45-55	40-50	30-40	20-35	25-40	5-15
	1-43	Very gravelly sandy clay, very gravelly clay.	GC	A-2	0	45-55	40-50	30-40	20-35	40-55	20-30
	43-60	Gravelly loamy sand, very gravelly loamy sand.	GP-GM, SP-SM	A-1	0	45-55	40-50	25-30	5-10	---	NP
Gunsight--------	0-3	Very gravelly sandy loam.	GM	A-1	0-10	35-55	20-50	15-30	10-20	15-20	NP-5
	3-60	Very gravelly loam, very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-10	35-55	30-50	25-50	10-30	15-25	NP-10
Cipriano--------	0-8	Very gravelly loam.	GM-GC	A-2	5-10	45-60	40-50	35-50	20-35	20-30	5-10
	8	Indurated--------	---	---	---	---	---	---	---	---	---
48*, 49*:											
Ebon----------	0-1	Very gravelly loam.	GC, GM-GC	A-2	0	45-55	40-50	30-40	20-35	25-40	5-15
	1-43	Very gravelly sandy clay, very gravelly clay.	GC	A-2	0	45-55	40-50	30-40	20-35	40-55	20-30
	43-60	Gravelly loamy sand, very gravelly loamy sand.	GP-GM, SP-SM	A-1	0	45-55	40-50	25-30	5-10	---	NP
Pinamt----------	0-3	Extremely gravelly sandy loam.	GM, GP-GM	A-1	0-15	25-35	20-25	10-20	5-15	15-20	NP-5
	3-15	Very gravelly sandy clay loam, very gravelly clay loam, extremely gravelly loam.	GC	A-2	0-15	65-85	40-50	30-45	25-40	25-35	10-15
	15-60	Extremely gravelly sandy loam, very gravelly loam, very gravelly sandy clay loam.	GP-GC, GM-GC	A-2	15-30	20-55	15-50	10-40	5-35	20-30	5-10
50*:											
Estrella--------	0-21	Loam----------	CL-ML	A-4	0	100	100	80-90	50-70	20-25	5-10
Calcareous	21-55	Clay loam, sandy clay loam, loam.	CL, SC	A-6	0	100	100	80-90	45-75	30-35	10-15
	55-60	Gravelly sandy loam.	SM	A-2	0	70-85	60-75	35-50	20-30	15-20	NP-5
Estrella--------	0-21	Loam----------	CL-ML	A-4	0	100	100	80-90	50-70	20-25	5-10
Noncalcareous	21-55	Clay loam, sandy clay loam, loam.	CL, SC	A-6	0	100	100	80-90	45-75	30-35	10-15
	55-60	Gravelly sandy loam.	SM	A-2	0	70-85	60-75	35-50	20-30	15-20	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
51*:											
Gachado	0-2	Very gravelly sandy loam.	GM, SM	A-1	5-10	35-60	25-50	15-35	10-20	20-25	NP-5
	2-8	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GC, SC	A-2	20-40	50-60	20-35	20-25	15-20	30-40	10-15
	8-15	Weathered bedrock	---	---	---	---	---	---	---	---	---
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lomitas	0-2	Extremely gravelly sandy loam.	GM, GM-GC	A-2, A-1	15-25	35-45	20-25	15-20	10-15	15-25	NP-10
	2-17	Very gravelly sandy loam, very gravelly loam, extremely gravelly sandy loam.	GM, GM-GC	A-2, A-1	15-25	40-50	30-45	25-35	15-25	20-30	NP-10
	12-20	Weathered bedrock	---	---	---	---	---	---	---	---	---
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
52*:											
Gachado	0-1	Very gravelly loam.	GM-GC	A-2	5-10	35-60	25-50	20-45	15-35	20-25	5-10
	1-7	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GC, SC	A-2	20-40	50-60	20-35	20-25	15-20	30-40	10-15
	7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lomitas	0-1	Very gravelly sandy loam.	GM, GM-GC	A-2, A-1	5-25	40-50	35-45	20-35	10-25	15-25	NP-10
	1-10	Very gravelly sandy loam, very gravelly loam, extremely gravelly sandy loam.	GM, GM-GC	A-2, A-1	15-25	40-50	30-45	25-35	15-25	20-30	NP-10
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
53	0-3	Clay	CH	A-7	0	100	100	90-100	80-90	50-60	25-35
Gadsden	3-60	Clay, silty clay, silty clay loam.	CH	A-7	0	100	100	95-100	80-90	50-60	25-35
54*:											
Gila	0-2	Fine sandy loam	ML	A-4	0	95-100	95-100	75-90	50-65	15-20	NP-5
Noncalcareous	2-60	Stratified silt loam to gravelly sandy loam.	ML, SM	A-4	0	80-100	70-100	50-80	40-65	20-30	NP-5
Gila	0-2	Fine sandy loam	ML	A-4	0	95-100	95-100	75-90	50-65	15-20	NP-5
Calcareous	2-60	Stratified silt loam to gravelly sandy loam.	ML, SM	A-4	0	80-100	70-100	50-80	40-65	20-30	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
55*, 56*:											
Gilman	0-5	Loam	CL	A-6	0	100	95-100	85-95	60-70	25-30	10-15
Noncalcareous	5-43	Loam, silt loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-100	60-85	20-25	5-10
	43-60	Fine sandy loam.	SM	A-4	0	100	95-100	65-85	40-50	20-25	NP-5
Gilman	0-5	Loam	CL	A-6	0	100	95-100	85-95	60-70	25-30	10-15
Calcareous	5-43	Loam, silt loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-100	60-85	20-25	5-10
	43-60	Fine sandy loam.	SM	A-4	0	100	95-100	65-85	40-50	20-25	NP-5
57	0-11	Clay loam	ML, CL	A-6	0	100	95-100	90-100	70-80	35-40	10-15
Gilman	11-60	Loam, silt loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-100	60-85	20-25	5-10
58*, 59*:											
Gilman	0-2	Loam	CL	A-6	0	100	95-100	85-95	60-70	25-30	10-15
	2-60	Loam, silt loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-100	60-85	20-25	5-10
Momoli	0-22	Gravelly sandy loam.	SM	A-2, A-1	0-5	65-80	60-75	35-50	20-30	20-30	NP-5
	22-60	Very gravelly loam, very gravelly fine sandy loam, extremely gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-5	40-65	20-50	15-40	10-35	20-30	NP-10
Denure	0-9	Gravelly sandy loam.	CL-ML	A-2	0	75-85	65-75	40-50	20-30	20-25	5-10
	9-60	Gravelly sandy loam, gravelly loam, sandy loam.	SM, SM-SC	A-2, A-4	0	80-100	70-95	50-70	30-50	20-25	NP-10
60*:											
Glenbar	0-6	Loam	ML, CL-ML	A-4	0	100	100	95-100	70-80	20-30	NP-10
Noncalcareous	6-48	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0	100	100	95-100	75-95	35-45	15-20
	48-60	Gravelly sandy clay loam, sandy clay loam.	CL-ML, SM-SC	A-4	0	85-100	70-100	55-95	45-55	25-35	5-10
Glenbar	0-6	Loam	ML, CL-ML	A-4	0	100	100	95-100	70-80	20-30	NP-10
Calcareous	6-48	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0	100	100	95-100	75-95	35-45	15-20
	48-60	Gravelly sandy clay loam, sandy clay loam.	CL-ML, SM-SC	A-4	0	85-100	70-100	55-95	45-55	25-35	5-10
61*, 62*:											
Gran	0-1	Very gravelly sandy loam.	SM	A-1	0	90-100	30-50	20-35	10-20	10-20	NP-5
	1-12	Very gravelly sandy clay, very gravelly clay, extremely gravelly sandy clay.	SC	A-2	0	90-100	20-50	20-40	15-30	45-55	20-30
	12-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
61*, 62*:											
Wickenburg------	0-1	Gravelly sandy loam.	SM	A-2, A-4, A-1	0	60-100	50-100	30-70	15-40	15-20	NP-5
	1-12	Very gravelly sandy loam, very gravelly sandy clay loam, very gravelly loam.	GM-GC	A-2	0	40-60	30-50	25-45	10-35	20-30	5-10
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
63*, 64*:											
Gran----------	0-1	Very gravelly sandy loam.	SM	A-1	0	90-100	30-50	20-35	10-20	10-20	NP-5
	1-12	Very gravelly sandy clay, very gravelly clay, extremely gravelly sandy clay.	SC	A-2	0	90-100	20-50	20-40	15-30	45-55	20-30
	12-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Wickenburg------	0-1	Gravelly sandy loam.	SM	A-2, A-4, A-1	0	60-100	50-75	30-60	15-40	15-20	NP-5
	1-12	Very gravelly sandy loam, very gravelly sandy clay loam, very gravelly loam.	GM-GC	A-2	0	40-60	30-50	25-45	10-35	20-30	5-10
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
65*:											
Greyeagle-------	0-5	Very gravelly loam, gravelly loam.	GM-GC, SM-SC	A-2, A-4	0-10	50-85	40-75	20-60	15-50	20-30	5-10
	5-10	Very gravelly sandy loam, very gravelly loamy sand.	GP-GM, GM	A-1	0	30-55	25-50	15-35	5-20	---	NP
	10	Cemented---------	---	---	---	---	---	---	---	---	---
Continental-----	0-2	Loam-------------	CL, CL-ML	A-4, A-6	0	90-100	85-95	75-90	55-70	25-40	5-15
	2-60	Clay, clay loam--	CL, CH	A-7	0	95-100	90-100	90-100	75-95	45-55	20-30
Nickel----------	0-5	Very gravelly loam.	GM-GC	A-2	0	50-60	40-50	35-50	25-35	20-25	5-10
	5-60	Gravelly loam, very gravelly loam.	GM-GC, SM-SC	A-2, A-4	0	55-75	45-65	40-60	25-45	20-30	5-10
66*:											
Greyeagle-------	0-5	Very gravelly loam, gravelly loam.	GM-GC	A-2, A-4	0-10	50-85	40-75	20-60	15-50	20-30	5-10
	5-10	Very gravelly sandy loam, very gravelly loamy sand.	GP-GM, GM	A-1	0	30-55	25-50	15-35	5-20	---	NP
	10	Cemented---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
66*:											
Suncity Variant-	0-2	Very gravelly sandy loam.	SM, SM-SC, GM, GM-GC	A-2	0	50-60	45-50	30-35	10-20	20-30	NP-10
	2-9	Clay loam, gravelly clay loam, gravelly sandy clay loam.	CL, SC	A-6	0	75-95	70-90	70-80	40-60	30-40	10-15
	9	Indurated--------	---	---	---	---	---	---	---	---	---
67----------	0-2	Clay----------	CH, CL	A-7	0	95-100	95-100	90-100	75-95	45-55	30-40
Guest	2-60	Clay, clay loam, silty clay.	CL, CH	A-7	0	90-100	90-100	80-100	60-90	40-55	20-35
68*, 69*:											
Gunsight--------	0-1	Very gravelly sandy loam.	GM	A-1	0-10	35-55	20-50	15-30	10-20	15-20	NP-5
	1-60	Very gravelly loam, very gravelly sandy loam, extremely gravelly loam.	GM-GC	A-2, A-1	0-10	35-55	20-50	15-50	5-30	25-30	5-10
Cipriano--------	0-6	Very gravelly loam.	GM-GC	A-2	5-10	45-60	40-50	35-50	20-35	20-30	5-10
	6	Indurated--------	---	---	---	---	---	---	---	---	---
70*, 71*:											
Gunsight--------	0-11	Very gravelly loam.	GM-GC, GP-GC	A-2, A-1	0-10	35-55	30-50	25-50	10-35	20-30	5-10
	11-60	Very gravelly loam, very gravelly sandy loam, extremely gravelly loam.	GM-GC	A-2, A-1	0-10	35-55	20-50	15-50	5-30	25-30	5-10
Rillito---------	0-12	Gravelly loam----	SM-SC, GM-GC	A-2, A-4	0	65-80	60-75	40-65	30-50	25-30	5-10
	12-36	Gravelly sandy loam, sandy loam.	SM	A-2, A-1	0	65-80	60-75	35-50	20-30	15-20	NP-5
	36-60	Very gravelly sandy loam, extremely gravelly loam.	GM, GM-GC, GP-GM	A-1, A-2	0	30-60	20-50	15-40	5-30	20-25	NP-10
72*, 73*:											
Lehmans---------	0-2	Very gravelly clay loam.	GC	A-2, A-6	0-15	40-60	30-50	25-50	20-40	30-40	10-15
	2-20	Clay, gravelly clay, clay loam.	CH, SC	A-7	0-5	75-100	55-80	50-75	40-65	50-60	30-40
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
74*:											
Luke----------	0-1	Very gravelly sandy clay loam.	GM-GC, SM-SC	A-2	0-5	40-60	35-50	20-35	10-20	25-30	5-10
	1-28	Very gravelly sandy clay, very gravelly clay, extremely gravelly clay.	GC	A-2, A-7	0-5	25-55	20-50	20-40	10-40	45-60	20-40
	28-34	Indurated--------	---	---	---	---	---	---	---	---	---
	34-60	Cemented---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
74*:											
Cipriano--------	0-6	Very gravelly loam.	GM-GC	A-2	5-10	45-60	40-50	35-50	20-35	20-30	5-10
	6-20	Indurated--------	---	---	---	---	---	---	---	---	---
75----------	0-7	Loam----------	CL	A-6	0	100	100	85-95	70-80	30-40	10-15
Mohall	7-60	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	95-100	75-85	35-70	30-35	10-15
76----------	0-7	Loam----------	CL-ML	A-4	0	100	100	85-95	60-75	25-30	5-10
Mohall	7-60	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	95-100	75-85	35-70	30-35	10-15
77----------	0-2	Clay loam--------	CL	A-6	0	100	100	85-95	70-80	30-40	10-15
Mohall	2-42	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	95-100	75-85	35-70	30-35	10-15
	42-60	Extremely cobbly loamy sand.	SM	A-2	60-70	80-90	70-80	40-65	10-20	---	NP
78----------	0-6	Clay loam--------	CL, ML	A-6, A-7	0	100	100	90-100	70-80	35-45	10-20
Mohall	6-60	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	95-100	75-85	35-70	30-35	10-15
79----------	0-12	Clay----------	CL, CH	A-7	0	100	100	85-95	75-85	45-55	20-30
Mohall	12-60	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	95-100	75-85	35-70	30-35	10-15
80*, 81*:											
Mohall----------	0-2	Loam----------	CL	A-6	0	100	100	85-95	70-80	30-40	10-15
	2-42	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	95-100	75-85	35-70	30-35	10-15
	42-60	Extremely cobbly loamy sand.	SM	A-2	60-70	80-90	70-80	40-65	10-25	---	NP
Tremant---------	0-1	Gravelly loam----	SM, SM-SC	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-10
	1-5	Clay loam, gravelly clay loam, gravelly sandy clay loam.	CL	A-6	0-10	80-90	65-85	60-70	50-60	30-40	10-20
	5-29	Gravelly loam, gravelly sandy clay loam, gravelly clay loam.	CL	A-4	0-10	80-90	65-75	60-70	50-55	20-35	10-15
	29-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
82----------	0-2	Sandy loam-------	SM, SM-SC	A-2	0	75-100	70-100	55-75	25-45	20-30	NP-10
Mohave	2-20	Clay loam, loam	CL, CL-ML	A-6, A-7	0	100	95-100	85-95	70-80	25-45	15-25
	20-60	Loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-95	50-75	20-25	5-10
83----------	0-2	Loam----------	CL, CL-ML	A-4, A-6	0	100	95-100	75-85	65-75	25-35	5-15
Mohave	2-20	Clay loam, loam	CL, CL-ML	A-6, A-7	0	100	95-100	85-95	70-80	25-45	15-25
	20-60	Loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-95	50-75	20-25	5-10
84----------	0-2	Loam----------	CL-ML	A-4	0	100	95-100	80-95	55-75	20-25	5-10
Mohave	2-28	Loam, sandy clay loam, clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	80-90	50-80	25-40	5-15
	28-60	Loam----------	CL-ML	A-4	0	100	95-100	80-95	55-75	20-25	5-10
85----------	0-6	Clay loam--------	CL	A-6, A-7	0	100	95-100	85-95	70-80	35-45	15-25
Mohave	6-20	Clay loam--------	CL	A-6, A-7	0	100	95-100	85-95	70-80	35-45	15-25
	20-60	Loam----------	CL-ML	A-4	0	100	95-100	80-95	55-75	20-25	5-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
86---------- Mohave	0-2	Clay loam--------	CL	A-6, A-7	0	100	95-100	85-95	65-80	30-45	10-20
	2-60	Loam, sandy clay loam, clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	80-90	50-80	25-40	5-15
87*:											
Mohave---------- Noncalcaresou	0-2	Sandy loam-------	SM, SM-SC	A-2	0	75-100	70-100	55-75	25-45	20-30	NP-10
	2-20	Clay loam, loam	CL, CL-ML	A-6, A-7	0	100	95-100	85-95	70-80	25-45	15-25
	20-60	Loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-95	50-75	20-25	5-10
Mohave---------- Calcareous	0-2	Gravelly sandy loam.	SM	A-2, A-4	0	80-100	70-95	60-85	30-50	20-25	NP-5
	2-20	Loam, sandy clay loam, clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	80-90	50-80	25-40	5-15
	20-60	Loam-------------	CL-ML	A-4	0	100	95-100	80-95	55-75	20-25	5-10
88*:											
Mohave----------	0-2	Sandy loam-------	SM, SM-SC	A-2	0	75-100	70-100	55-75	25-45	20-30	NP-10
	2-20	Clay loam, loam	CL, CL-ML	A-6, A-7	0	100	95-100	85-95	70-80	25-45	15-25
	20-60	Loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-95	50-75	20-25	5-10
Guest-----------	0-2	Clay loam--------	ML, CL	A-4, A-6	0	95-100	90-100	80-100	70-90	35-45	10-20
	2-60	Clay, clay loam, silty clay.	CL, CH	A-7	0	90-100	90-100	80-100	60-90	40-55	20-35
89*:											
Mohave----------	0-2	Clay loam--------	CL	A-6, A-7	0	100	95-100	85-95	70-80	35-45	15-25
	2-20	Clay loam, loam	CL, CL-ML	A-6, A-7	0	100	95-100	85-95	70-80	25-45	15-25
	20-60	Loam, very fine sandy loam.	CL-ML	A-4	0	100	95-100	80-95	50-75	20-25	5-10
Tres Hermanos---	0-2	Gravelly loam----	SM-SC, SM	A-2, A-4	0-5	70-90	60-75	50-70	30-50	20-30	NP-10
	2-20	Gravelly loam, gravelly clay loam, clay loam.	GC, CL	A-6, A-7	0-5	65-100	60-100	50-90	40-75	30-45	10-20
	20-60	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GM	A-2, A-1	0-15	35-60	35-50	25-45	15-35	20-30	NP-5
90---------- Momoli	0-3	Gravelly sandy loam.	SM	A-2, A-1	0-5	65-80	60-75	35-50	20-30	20-30	NP-5
	3-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-5	40-65	25-50	20-40	10-35	20-30	NP-10
91*:											
Momoli----------	0-1	Very gravelly sandy loam.	SM, GM	A-1	0-5	35-65	30-50	15-35	10-20	20-25	NP-5
	1-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam.	GM, GM-GC	A-2, A-1	0-5	40-65	25-50	20-40	10-35	20-30	NP-10
Carrizo----------	0-11	Very gravelly sandy loam.	SM, GM	A-2, A-1	0-5	40-60	30-50	20-35	10-20	20-25	NP-5
	11-60	Extremely gravelly loamy sand.	GM	A-1	0-5	25-35	15-25	10-20	5-10	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
92*:											
Momoli----------	0-1	Very gravelly sandy loam.	SM, GM	A-1	0-5	35-65	30-50	15-35	10-20	20-25	NP-5
	1-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam.	GM, GM-GC	A-2, A-1	0-5	40-65	25-50	20-40	10-35	20-30	NP-10
Carrizo---------	0-11	Very gravelly sandy loam.	GM, SM	A-1	0-5	30-55	25-50	15-35	10-25	20-30	NP-5
	11-60	Very gravelly coarse sandy loam, very gravelly loamy sand.	GM	A-1	5-15	25-35	15-25	10-20	5-10	---	NP
93*, 94*:											
Nickel----------	0-1	Very gravelly loam.	SM, GM	A-2, A-1	0	45-60	30-50	20-35	10-20	15-20	NP-5
	1-10	Gravelly loam, very gravelly loam.	GM-GC, SM-SC	A-2, A-4	0	55-75	45-65	40-60	25-45	20-30	5-10
	10-60	Very gravelly sandy loam.	GM	A-1, A-2	0	45-55	40-50	20-35	10-20	15-20	NP-5
Cave----------	0-1	Gravelly loam----	SM-SC	A-4	0-5	70-90	60-75	40-65	35-50	25-30	5-10
	1-14	Loam, gravelly loam.	CL-ML, SM-SC	A-4	0-5	75-95	70-90	60-80	40-60	20-25	5-10
	14-20	Indurated--------	---	---	---	---	---	---	---	---	---
	20-60	Gravelly loamy sand, very gravelly sandy loam.	GM, SM	A-1, A-2	0-5	35-75	30-60	20-35	10-30	---	NP
95---------- Ohaco	0-2	Gravelly loam----	CL-ML, ML, SM-SC, SM	A-4	0-5	70-80	65-75	55-70	40-55	25-35	5-10
	2-27	Clay, clay loam	CL, CH	A-7	0	90-100	90-95	80-90	65-80	40-55	15-30
	27-31	Gravelly sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	0	55-80	50-75	35-55	20-35	20-25	NP-10
	31	Indurated--------	---	---	---	---	---	---	---	---	---
96*, 97*:											
Pinaleno--------	0-1	Very gravelly clay loam.	GM, GC	A-2, A-6, A-7	0-10	45-55	40-50	35-50	30-40	35-45	10-20
	1-12	Gravelly clay loam, very gravelly clay loam.	GM, GC	A-2, A-6, A-7	0	50-70	40-60	35-55	30-50	35-45	10-20
	12-60	Loam, gravelly loam.	CL-ML, SM-SC	A-4	0	80-95	70-85	60-80	40-60	20-30	5-10
Tres Hermanos---	0-2	Gravelly loam----	SM-SC, SM	A-2, A-4	0-5	70-90	60-75	50-70	30-50	20-30	NP-10
	2-22	Very gravelly clay loam, gravelly clay loam, clay loam.	GC, CL	A-6, A-7	0-5	65-100	40-100	40-90	30-75	25-45	10-20
	22-60	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GM	A-2, A-1	0-15	35-60	35-50	25-45	15-35	20-30	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
98*, 99*:											
Pinamt----------	0-1	Extremely gravelly sandy loam.	GM, GP-GM	A-1	0-15	25-55	20-50	10-35	5-20	15-20	NP-5
	1-28	Very gravelly sandy clay loam, extremely gravelly sandy clay loam, very gravelly loam.	GC	A-2	15-30	20-55	15-50	10-40	10-35	25-35	10-15
	28-60	Extremely gravelly sandy loam, very gravelly loam, very gravelly sandy clay loam.	GP-GC, GM-GC	A-2	15-30	20-55	15-50	10-40	5-35	20-30	5-10
Tremant---------	0-5	Gravelly loam----	SM, SM-SC	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-10
	5-29	Clay loam, gravelly clay loam, sandy clay loam.	CL	A-6	0-10	80-90	65-85	60-70	50-60	30-40	10-20
	29-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
100*:											
Quilotosa-------	0-2	Extremely gravelly sandy loam.	GP-GM	A-1	5-15	30-35	20-25	10-20	5-10	20-25	NP-5
	2-14	Extremely gravelly loam, extremely gravelly fine sandy loam.	GM-GC, GM	A-1, A-2	0-5	30-35	20-25	10-20	5-15	20-25	NP-10
	14-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Vaiva-----------	0-3	Very gravelly loam.	GM-GC	A-2, A-4	0-5	45-55	40-50	35-45	25-40	25-30	5-10
	3-11	Very gravelly sandy clay loam, very gravelly clay loam, very gravelly loam.	GC, GM-GC, GP-GC	A-2, A-1	0-5	25-40	15-35	10-30	5-25	25-35	5-15
	11-17	Weathered bedrock	---	---	---	---	---	---	---	---	---
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
101---------- Rillito	0-24	Loam----------	SM-SC, CL-ML	A-2, A-4	0	80-90	75-90	50-70	25-60	20-30	5-10
	24-39	Gravelly loam----	SM-SC, CL-ML, GM-GC	A-4	0	65-80	60-75	50-70	35-55	20-30	5-10
	39-60	Very gravelly sandy loam, extremely gravelly loam.	GM, GM-GC, GP-GM	A-1, A-2	0	30-60	20-50	15-40	5-30	20-25	NP-10
102---------- Rillito	0-14	Gravelly loam----	SM-SC, GM-GC	A-2, A-4	0	65-80	60-75	40-65	30-50	25-30	5-10
	14-60	Gravelly loam----	SM-SC, CL-ML, GM-GC	A-4	0	65-80	60-75	50-70	35-55	20-30	5-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
103*: Rock outcrop.											
Gachado	0-1	Very gravelly loam.	GM-GC	A-2	5-10	35-60	25-50	20-45	15-35	20-25	5-10
	1-7	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GC, SC	A-2	20-40	50-60	20-35	20-25	15-20	30-40	10-15
	7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
104*, 105*: Rock outcrop.											
Lehmans	0-2	Very gravelly clay loam.	GC	A-2, A-6	0-15	40-60	30-50	25-50	20-40	30-40	10-15
	2-15	Clay, gravelly clay, gravelly clay loam.	CH, SC	A-7	0-5	75-100	55-80	50-75	40-65	50-60	30-40
	15-20	Very gravelly clay loam.	GC	A-2, A-6	0-15	40-60	30-50	25-50	20-40	30-40	10-15
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
106*, 107*:											
Sal	0-2	Extremely gravelly loam.	GM-GC, GP-GC, GC	A-2, A-1	0	20-30	10-25	10-25	5-15	20-30	5-15
	2-20	Very gravelly clay loam, extremely gravelly clay loam.	GC	A-2	0	30-60	20-50	20-50	15-35	30-40	15-25
	20	Indurated	---	---	---	---	---	---	---	---	---
Cipriano	0-20	Very gravelly sandy loam, sandy loam.	GM-GC	A-2	5-10	45-60	40-55	35-50	20-35	20-30	5-10
	20	Indurated	---	---	---	---	---	---	---	---	---
108*, 109*:											
Schenco	0-2	Extremely channery loam.	GC, GP-GC	A-2	0-10	20-50	10-25	10-25	5-20	25-35	10-15
	2-11	Very channery loam, very channery clay loam.	GC	A-2, A-6	0-5	40-60	30-50	25-50	20-40	25-35	10-15
	11-22	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
110*:											
Suncity	0-1	Gravelly loam	GM-GC, SM-SC	A-4	0-5	65-80	60-75	50-70	35-50	20-30	5-10
	1-9	Clay loam, loam, gravelly clay loam.	CL	A-6	0-5	80-100	70-90	60-80	50-60	30-40	10-15
	9-60	Indurated	---	---	---	---	---	---	---	---	---
Cipriano	0-6	Very gravelly loam.	GM-GC	A-2	5-10	45-60	40-50	35-50	20-35	20-30	5-10
	6	Indurated	---	---	---	---	---	---	---	---	---
111. Torriorthents											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
112*:											
Tremant--------- Noncalcareous	0-9	Gravelly sandy loam.	SM	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-5
	9-41	Clay loam, gravelly clay loam, gravelly sandy clay loam.	CL	A-6	0-10	80-90	65-85	60-70	50-60	30-40	10-20
	41-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
Tremant--------- Calcareous	0-9	Gravelly sandy loam.	SM	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-5
	9-41	Clay loam, gravelly clay loam, gravelly sandy clay loam.	CL	A-6	0-10	80-90	65-85	60-70	50-60	30-40	10-20
	41-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
113*, 114*:											
Tremant--------- Calcareous	0-9	Gravelly loam----	SM, SM-SC	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-10
	9-41	Gravelly loam, gravelly sandy clay loam, gravelly clay loam.	CL	A-4	0-10	80-90	65-75	60-70	50-55	20-35	10-15
	41-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
Tremant--------- Noncalcareous	0-9	Gravelly loam----	SM, SM-SC	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-10
	9-41	Gravelly loam, gravelly sandy clay loam, gravelly clay loam.	CL	A-4	0-10	80-90	65-75	60-70	50-55	20-35	10-15
	41-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
115*:											
Tremant---------	0-9	Gravelly sandy loam.	SM	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-5
	9-41	Gravelly loam, gravelly sandy clay loam, gravelly clay loam.	CL	A-4	0-10	80-90	65-75	60-70	50-55	20-35	10-15
	41-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
Antho-----------	0-3	Sandy loam-------	SM	A-2, A-2	0	100	95-100	60-70	30-40	15-20	NP-5
	3-60	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0	70-100	65-95	35-60	15-40	15-20	NP-5
116*, 117*:											
Tremant---------	0-2	Gravelly loam----	SM, SM-SC	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-10
	2-26	Clay loam, gravelly clay loam, gravelly sandy clay loam.	CL	A-6	0-10	80-90	65-85	60-70	50-60	30-40	10-20
	26-60	Very gravelly sandy clay loam, extremely gravelly sandy clay loam, extremely cobbly sandy clay loam.	GM-GC	A-2	0-30	30-60	20-50	20-40	15-35	10-30	5-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
116*, 117*:											
Gunsight--------	0-10	Very gravelly sandy loam.	GM	A-1	0-10	35-55	20-50	15-30	10-20	15-20	NP-5
	10-60	Very gravelly loam, very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-10	35-55	30-50	25-50	10-30	15-25	NP-10
Rillito---------	0-2	Gravelly loam----	SM-SC, GM-GC	A-2, A-4	0	65-80	60-75	40-65	30-50	25-30	5-10
	2-60	Gravelly loam, gravelly sandy loam.	SM-SC, CL-ML, GM-GC	A-4	0	65-80	60-75	50-70	35-55	20-30	5-10
118*:											
Tremant---------	0-9	Gravelly sandy loam.	SM	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-5
	9-41	Gravelly loam, gravelly sandy clay loam, gravelly clay loam.	CL	A-4	0-10	80-90	65-75	60-70	50-55	20-35	10-15
	41-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
Rillito---------	0-12	Gravelly loam----	SM-SC, GM-GC	A-2, A-4	0	65-80	60-75	40-65	30-50	25-30	5-10
	12-36	Gravelly sandy loam, sandy loam.	SM	A-2, A-1	0	65-80	60-75	35-50	20-30	15-20	NP-5
	36-60	Very gravelly sandy loam, extremely gravelly loam.	GM, GM-GC, GP-GM	A-1, A-2	0	30-60	20-50	15-40	5-30	20-25	NP-10
119*:											
Tremant---------	0-9	Gravelly loam----	SM, SM-SC	A-4, A-2, A-1	0-5	75-100	50-75	40-60	20-50	20-30	NP-10
	9-41	Gravelly loam, gravelly sandy clay loam, gravelly clay loam.	CL	A-4	0-10	80-90	65-75	60-70	50-55	20-35	10-15
	41-60	Gravelly sand----	SP-SM	A-1	0-10	80-90	65-75	30-50	5-10	---	NP
Suncity---------	0-2	Very gravelly loam.	GM-GC	A-2, A-1	0-5	35-55	30-50	25-50	15-35	20-30	5-10
	2-12	Clay loam, loam, gravelly clay loam.	CL	A-6	0-5	80-100	70-90	60-80	50-60	30-40	10-15
	12-60	Indurated--------	---	---	---	---	---	---	---	---	---
120*:											
Tres Hermanos--- Calcareous	0-2	Gravelly sandy loam.	SM	A-2, A-4	0-5	70-90	60-75	50-70	30-50	20-30	NP-5
	2-22	Very gravelly loam, gravelly clay loam, clay loam.	GC, CL	A-6, A-7, A-2	0-5	65-100	40-100	30-90	25-75	30-45	10-20
	22-60	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GM	A-2, A-1	0-15	35-60	35-50	25-45	15-35	20-30	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
120*:											
Tres Hermanos--- Noncalcareous	0-2	Gravelly sandy loam.	SM	A-2, A-4	0-5	70-90	60-75	50-70	30-50	20-30	NP-5
	2-22	Very gravelly loam, gravelly clay loam, clay loam.	GC, CL	A-6, A-7, A-2	0-5	65-100	40-100	30-90	25-75	30-45	10-20
	22-60	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GM	A-2, A-1	0-15	35-60	35-50	25-45	15-35	20-30	NP-5
121*:											
Tres Hermanos---	0-2	Gravelly loam----	SM-SC, SM	A-2, A-4	0-5	70-90	60-75	50-70	30-50	20-30	NP-10
	2-22	Very gravelly clay loam, gravelly clay loam, clay loam.	GC, CL	A-6, A-7	0-5	65-100	40-100	35-90	25-75	30-45	10-20
	22-60	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GM	A-2, A-1	0-15	35-60	35-50	25-45	15-35	20-30	NP-5
Anthony---------	0-2	Sandy loam-------	SM, ML	A-4	0	95-100	90-100	55-85	35-65	20-30	NP-5
	2-40	Very gravelly sandy loam, gravelly sandy loam.	GM, SM	A-1, A-2	15-25	45-65	40-60	25-35	10-30	---	NP
	40-60	Loam----------	CL-ML, ML	A-4	0	100	100	95-100	70-80	20-30	NP-10
122---------- Vado	0-2	Gravelly sandy loam.	SM	A-1, A-2	0	70-85	60-75	35-50	20-30	20-25	NP-5
	2-60	Very gravelly sandy loam.	SM, GM	A-1, A-2	0	35-60	25-50	20-35	10-20	10-20	NP-5
123---------- Vaiva	0-3	Very gravelly loam.	GM-GC	A-2, A-4	0-5	45-55	40-50	35-45	25-40	25-30	5-10
	3-11	Very gravelly sandy clay loam, very gravelly clay loam, very gravelly loam.	GC, GM-GC, GP-GC	A-2, A-1	0-5	25-40	15-35	10-30	5-25	25-35	5-15
	11-17	Weathered bedrock	---	---	---	---	---	---	---	---	---
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
124*:											
Valencia-------- Noncalcareous	0-20	Sandy loam-------	SM	A-2, A-4	0	80-100	75-100	50-70	25-40	15-20	NP-5
	20-60	Clay loam, sandy clay loam, gravelly sandy clay loam.	CL, ML, SM, SC	A-6, A-7, A-2	0	70-85	60-85	50-60	25-55	35-45	10-20
Valencia-------- Calcareous	0-20	Sandy loam-------	SM	A-2, A-4	0	80-100	75-100	50-70	25-40	15-20	NP-5
	20-60	Clay loam, sandy clay loam, gravelly sandy clay loam.	CL, ML, SM, SC	A-6, A-7, A-2	0	70-85	60-85	50-60	25-55	35-45	10-20
125---------- Vint	0-60	Loamy fine sand	SM	A-2	0	95-100	95-100	70-80	25-35	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors -T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
1*:									
Antho	0-3	5-15	2.0-6.0	0.10-0.12	7.9-8.4	<4	Low	0.20	5
Noncalcareous	3-60	5-15	2.0-6.0	0.08-0.12	7.9-8.4	<4	Low	0.20	
Antho	0-3	5-15	2.0-6.0	0.10-0.12	7.9-8.4	<4	Low	0.20	5
Calcareous	3-60	5-15	2.0-6.0	0.08-0.12	7.9-8.4	<4	Low	0.20	
2*:									
Antho	0-3	5-15	2.0-6.0	0.08-0.11	7.9-8.4	<4	Low	0.17	5
Noncalcareous	3-60	5-15	2.0-6.0	0.08-0.12	7.9-8.4	<4	Low	0.20	
Antho	0-3	5-15	2.0-6.0	0.08-0.11	7.9-8.4	<4	Low	0.17	5
Calcareous	3-60	5-15	2.0-6.0	0.08-0.12	7.9-8.4	<4	Low	0.20	
3*:									
Antho	0-3	5-15	2.0-6.0	0.10-0.12	7.9-8.4	<4	Low	0.20	5
	3-60	5-15	2.0-6.0	0.08-0.12	7.9-8.4	<4	Low	0.20	
Carrizo	0-10	0-10	>20	0.05-0.10	7.9-8.4	<4	Low	0.10	5
	10-60	0-5	>20	0.03-0.04	7.9-8.4	<4	Low	0.02	
Maripo	0-18	5-15	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low	0.20	5
	18-29	5-15	2.0-6.0	0.11-0.15	7.9-8.4	<2	Low	0.24	
	29-60	3-5	6.0-20	0.03-0.06	7.9-8.4	<2	Low	0.10	
4*:									
Antho	0-3	5-15	2.0-6.0	0.10-0.12	7.9-8.4	<4	Low	0.20	5
	3-60	5-15	2.0-6.0	0.08-0.12	7.9-8.4	<4	Low	0.20	
Carrizo	0-10	0-10	>20	0.03-0.04	7.9-8.4	<4	Low	0.10	5
	10-60	0-5	>20	0.03-0.04	7.9-8.4	<4	Low	0.10	
Maripo	0-18	5-15	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low	0.20	5
	18-29	5-15	2.0-6.0	0.11-0.15	7.9-8.4	<2	Low	0.24	
	29-60	3-5	6.0-20	0.03-0.06	7.9-8.4	<2	Low	0.10	
5	0-2	5-20	2.0-6.0	0.11-0.14	7.9-8.4	<4	Low	0.20	5
Anthony	2-40	0-15	2.0-6.0	0.05-0.08	7.9-8.4	<4	Low	0.15	
	40-60	20-27	0.6-2.0	0.16-0.18	7.9-8.4	<4	Low	0.43	
6*, 7*:									
Anthony	0-2	5-20	2.0-6.0	0.11-0.14	7.9-8.4	<4	Low	0.20	5
	2-40	0-15	2.0-6.0	0.05-0.08	7.9-8.4	<4	Low	0.15	
	40-60	20-27	0.6-2.0	0.16-0.18	7.9-8.4	<4	Low	0.43	
Arizo	0-1	10-15	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low	0.15	5
	1-8	10-15	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low	0.15	
	8-60	3-8	>20	0.02-0.05	7.4-8.4	<2	Low	0.05	
8	0-1	10-15	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low	0.15	5
Arizo	1-8	10-15	2.0-6.0	0.06-0.08	7.4-8.4	<2	Low	0.10	
	8-60	3-8	>20	0.02-0.05	7.4-8.4	<2	Low	0.05	
9*:									
Beeline	0-1	10-20	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low	0.17	1
	1-9	10-25	2.0-6.0	0.12-0.16	7.9-8.4	<2	Low	0.24	
	9-60	---	---	---	---	---	---	---	
Cipriano	0-6	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low	0.20	1
	6	---	---	---	---	---	---	---	
10*, 11*:									
Brios	0-2	5-10	6.0-20	0.06-0.08	7.9-8.4	<2	Low	0.10	5
	2-60	2-15	6.0-20	0.04-0.08	7.9-8.4	<2	Low	0.10	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
10*, 11*:									
Carrizo	0-2	0-10	>20	0.03-0.04	7.9-8.4	<4	Low	0.10	5
	2-60	0-5	>20	0.03-0.04	7.9-8.4	<4	Low	0.02	
12	0-1	30-40	0.2-0.6	0.15-0.17	7.9-8.4	<2	Moderate	0.24	5
Carefree	1-50	40-55	0.06-0.2	0.12-0.15	7.9-8.4	<4	High	0.24	
	50-60	35-50	0.06-0.2	0.04-0.06	7.9-8.4	<4	High	0.10	
13*:									
Carefree	0-1	40-55	0.06-0.2	0.12-0.14	7.9-8.4	<2	High	0.20	5
	1-50	40-55	0.06-0.2	0.12-0.15	7.9-8.4	<4	High	0.24	
	50-60	35-50	0.06-0.2	0.04-0.06	7.9-8.4	<4	High	0.10	
Beardsley	0-2	25-30	0.6-2.0	0.12-0.15	7.9-8.4	<2	Low	0.24	2
	2-36	35-45	0.06-0.2	0.14-0.20	7.9-8.4	<2	High	0.28	
	36-42	---	---	---	---	---	---	---	
14	0-1	0-10	>20	0.03-0.04	7.9-8.4	<4	Low	0.10	5
Carrizo	1-60	0-5	>20	0.03-0.04	7.9-8.4	<4	Low	0.02	
15*:									
Carrizo	0-5	5-15	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low	0.17	5
	5-60	3-5	>20	0.02-0.05	7.4-8.4	<2	Low	0.02	
Gunsight	0-1	10-15	2.0-6.0	0.03-0.08	7.9-8.4	2-4	Low	0.10	5
	1-60	10-20	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low	0.10	
16*, 17*:									
Cellar	0-3	15-20	2.0-6.0	0.08-0.12	6.6-8.4	<2	Low	0.05	1
	3-12	---	---	---	---	---	---	---	
	12	---	---	---	---	---	---	---	
Rock outcrop.									
18*:									
Cherioni	0-1	10-25	0.6-2.0	0.04-0.06	7.9-8.4	<4	Low	0.17	1
	1-10	10-20	0.6-2.0	0.05-0.07	7.9-8.4	<4	Low	0.17	
	10-13	---	---	---	---	---	---	---	
	13	---	---	---	---	---	---	---	
Rock outcrop.									
19*:									
Chuckawalla	0-2	10-20	0.6-2.0	0.05-0.10	7.9-9.0	<2	Low	0.05	5
	2-14	20-30	0.6-2.0	0.05-0.11	7.9-9.0	8-16	Low	0.15	
	14-60	5-10	2.0-6.0	0.04-0.10	7.9-9.0	>16	Low	0.05	
Gunsight	0-3	15-25	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low	0.15	5
	3-60	10-20	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low	0.10	
20*:									
Chuckawalla	0-2	10-20	0.6-2.0	0.05-0.10	7.9-9.0	<2	Low	0.05	5
	2-14	20-30	0.6-2.0	0.05-0.11	7.9-9.0	8-16	Low	0.15	
	14-60	5-10	2.0-6.0	0.04-0.10	7.9-9.0	>16	Low	0.05	
Gunsight	0-3	15-25	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low	0.15	5
	3-60	10-20	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low	0.10	
21	0-6	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low	0.20	1
Cipriano	6	---	---	---	---	---	---	---	
22	0-2	27-45	0.06-0.2	0.14-0.20	7.4-8.4	<2	High	0.28	5
Contine	2-30	35-55	0.06-0.2	0.14-0.20	7.4-8.4	<2	High	0.24	
	30-60	10-20	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low	0.15	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
23----------	0-12	27-45	0.06-0.2	0.14-0.20	7.4-8.4	<2	High---------	0.28	5
Contine	12-26	35-55	0.06-0.2	0.14-0.20	7.4-8.4	<2	High---------	0.24	
	26-60	30-45	0.06-0.2	0.15-0.21	7.9-8.4	<2	High---------	0.24	
24----------	0-1	20-35	0.2-2.0	0.15-0.17	7.4-8.4	<2	Moderate-----	0.24	5
Continental	1-60	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
25----------	0-1	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.24	5
Continental	1-60	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
26----------	0-2	27-35	0.2-0.6	0.12-0.14	7.4-8.4	<2	Moderate-----	0.20	5
Continental	2-60	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
27*:									
Continental-----	0-1	20-35	0.2-2.0	0.15-0.17	7.4-8.4	<2	Moderate-----	0.24	5
	1-60	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
Mohave----------	0-2	10-20	2.0-6.0	0.09-0.13	6.6-8.4	<2	Low----------	0.20	5
	2-20	27-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.28	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
28*:									
Continental-----	0-2	27-35	0.2-0.6	0.12-0.14	7.4-8.4	<2	Moderate-----	0.20	5
	2-60	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
Ohaco----------	0-2	20-27	0.6-2.0	0.13-0.15	7.9-8.4	<2	Moderate-----	0.24	2
	2-27	35-45	0.06-0.2	0.14-0.20	7.9-8.4	<2	High---------	0.32	
	27-31	10-20	0.6-2.0	0.10-0.12	7.9-8.4	<2	Low----------	0.17	
	31	---	---	---	---	---	----------	----	
29*, 30*:									
Denure----------	0-2	5-15	2.0-6.0	0.13-0.15	7.9-8.4	<4	Low----------	0.24	5
	2-60	10-20	2.0-6.0	0.09-0.13	7.9-8.4	<4	Low----------	0.20	
Momoli----------	0-10	10-20	2.0-6.0	0.08-0.11	7.9-8.4	<4	Low----------	0.20	5
	10-32	10-20	2.0-6.0	0.05-0.10	7.9-8.4	<4	Low----------	0.10	
	32-60	10-20	2.0-6.0	0.04-0.07	7.9-8.4	<4	Low----------	0.05	
Carrizo---------	0-10	5-15	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low----------	0.17	5
	10-23	3-8	>20	0.03-0.05	7.4-8.4	<2	Low----------	0.05	
	23-60	3-5	>20	0.02-0.05	7.4-8.4	<2	Low----------	0.02	
31*, 32*:									
Dixaleta--------	0-1	10-20	2.0-6.0	0.04-0.06	7.4-8.4	<2	Low----------	0.05	1
	1-8	10-30	0.6-2.0	0.04-0.07	7.9-9.0	<2	Low----------	0.10	
	8-27	---	---	---	---	---	----------	----	
	27	---	---	---	---	---	----------	----	
Rock outcrop.									
33, 34, 35-------	0-3	8-18	0.6-2.0	0.06-0.09	6.6-8.4	<2	Low----------	0.10	5
Eba	3-36	40-50	0.06-0.2	0.05-0.08	7.4-8.4	<2	Moderate-----	0.10	
	36-60	10-20	2.0-6.0	0.04-0.07	7.4-8.4	<2	Low----------	0.05	
36*:									
Eba----------	0-3	8-18	0.6-2.0	0.06-0.09	6.6-8.4	<2	Low----------	0.10	5
	3-36	40-50	0.06-0.2	0.05-0.08	7.4-8.4	<2	Moderate-----	0.10	
	36-60	10-20	2.0-6.0	0.04-0.07	7.4-8.4	<2	Low----------	0.05	
Continental-----	0-1	20-35	0.2-2.0	0.15-0.17	7.4-8.4	<2	Moderate-----	0.24	5
	1-60	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
37*, 38*:									
Eba----------	0-3	8-18	0.6-2.0	0.06-0.09	6.6-8.4	<2	Low----------	0.10	5
	3-36	40-50	0.06-0.2	0.05-0.08	7.4-8.4	<2	Moderate-----	0.10	
	36-60	10-20	2.0-6.0	0.04-0.07	7.4-8.4	<2	Low----------	0.05	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
37*, 38*:									
Continental-----	0-1	20-35	0.2-2.0	0.15-0.17	7.4-8.4	<2	Moderate-----	0.24	5
	1-60	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
Cave----------	0-1	10-15	0.6-2.0	0.07-0.12	7.4-8.4	2-4	Low----------	0.24	1
	1-14	10-15	0.6-2.0	0.13-0.16	7.4-8.4	2-4	Low----------	0.28	
	14-20	---	---	---	---	---	----------	----	
	20-60	2-5	2.0-6.0	0.04-0.06	7.9-8.4	2-4	Low----------	0.10	
39*:									
Eba----------	0-3	8-18	0.6-2.0	0.06-0.09	6.6-8.4	<2	Low----------	0.10	5
	3-36	40-50	0.06-0.2	0.05-0.08	7.4-8.4	<2	Moderate-----	0.10	
	36-60	10-20	2.0-6.0	0.04-0.07	7.4-8.4	<2	Low----------	0.05	
Nickel----------	0-1	10-18	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low----------	0.15	5
	1-10	15-25	0.6-2.0	0.11-0.13	7.9-9.0	<2	Low----------	0.15	
	10-50	10-18	2.0-6.0	0.06-0.08	7.9-9.0	<2	Low----------	0.10	
	50-60	5-12	6.0-20	0.03-0.04	7.9-9.0	<2	Low----------	0.05	
Cave----------	0-1	10-15	0.6-2.0	0.07-0.12	7.4-8.4	2-4	Low----------	0.24	1
	1-14	10-15	0.6-2.0	0.13-0.16	7.4-8.4	2-4	Low----------	0.28	
	14-20	---	---	---	---	---	----------	----	
	20-60	2-5	2.0-6.0	0.04-0.06	7.9-8.4	2-4	Low----------	0.10	
40*, 41*, 42*, 43*:									
Eba----------	0-3	8-18	0.6-2.0	0.06-0.09	6.6-8.4	<2	Low----------	0.10	5
	3-36	40-50	0.06-0.2	0.05-0.08	7.4-8.4	<2	Moderate-----	0.10	
	36-60	10-20	2.0-6.0	0.04-0.07	7.4-8.4	<2	Low----------	0.05	
Pinaleno-------	0-1	30-40	0.2-0.6	0.12-0.14	7.9-8.4	<2	Moderate-----	0.10	5
	1-12	30-40	0.2-0.6	0.12-0.16	7.9-8.4	<2	Moderate-----	0.10	
	12-60	15-25	0.6-2.0	0.13-0.16	7.9-8.4	<2	Low----------	0.17	
44, 45----------	0-1	20-35	0.2-2.0	0.08-0.12	6.6-8.4	<2	Low----------	0.10	5
Ebon	1-43	35-50	0.06-0.2	0.07-0.10	7.9-8.4	<2	Moderate-----	0.10	
	43-60	5-10	6.0-20	0.04-0.06	7.9-8.4	<2	Low----------	0.02	
46*:									
Ebon----------	0-1	20-35	0.2-2.0	0.08-0.12	6.6-8.4	<2	Low----------	0.10	5
	1-43	35-50	0.06-0.2	0.07-0.10	7.9-8.4	<2	Moderate-----	0.10	
	43-60	5-10	6.0-20	0.04-0.06	7.9-8.4	<2	Low----------	0.02	
Contine---------	0-2	27-45	0.06-0.2	0.14-0.20	7.4-8.4	<2	High---------	0.28	5
	2-30	35-55	0.06-0.2	0.14-0.20	7.4-8.4	<2	High---------	0.24	
	30-60	10-20	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low----------	0.15	
47*:									
Ebon----------	0-1	20-35	0.2-2.0	0.08-0.12	6.6-8.4	<2	Low----------	0.10	5
	1-43	35-50	0.06-0.2	0.07-0.10	7.9-8.4	<2	Moderate-----	0.10	
	43-60	5-10	6.0-20	0.04-0.06	7.9-8.4	<2	Low----------	0.02	
Gunsight--------	0-3	10-15	2.0-6.0	0.03-0.08	7.9-8.4	2-4	Low----------	0.10	5
	3-60	10-20	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low----------	0.10	
Cipriano--------	0-8	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low----------	0.20	1
	8	---	---	---	---	---	----------	----	
48*, 49*:									
Ebon----------	0-1	20-35	0.2-2.0	0.08-0.12	6.6-8.4	<2	Low----------	0.10	5
	1-43	35-50	0.06-0.2	0.07-0.10	7.9-8.4	<2	Moderate-----	0.10	
	43-60	5-10	6.0-20	0.04-0.06	7.9-8.4	<2	Low----------	0.02	
Pinamt----------	0-3	10-15	2.0-6.0	0.03-0.08	7.9-8.4	2-4	Low----------	0.05	5
	3-15	20-30	0.2-0.6	0.03-0.11	7.9-8.4	2-4	Low----------	0.15	
	15-60	15-25	2.0-6.0	0.03-0.10	7.9-8.4	2-4	Low----------	0.15	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
50*:									
Estrella--------	0-21	15-20	0.6-2.0	0.15-0.20	7.4-8.4	<2	Low----------	0.32	5
Calcareous	21-55	25-35	0.2-0.6	0.14-0.20	7.9-8.4	<2	Moderate-----	0.24	
	55-60	10-20	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low----------	0.15	
Estrella--------	0-21	15-20	0.6-2.0	0.15-0.20	7.4-8.4	<2	Low----------	0.32	5
Noncalcareous	21-55	25-35	0.2-0.6	0.14-0.20	7.9-8.4	<2	Moderate-----	0.24	
	55-70	10-20	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low----------	0.15	
51*:									
Gachado---------	0-2	10-20	2.0-6.0	0.04-0.07	7.9-8.4	<2	Low----------	0.05	1
	2-8	25-30	0.2-0.6	0.06-0.08	7.9-8.4	<2	Low----------	0.15	
	8-15	---	---	---	---	---	----------	----	
	15	---	---	---	---	---	----------	----	
Lomitas---------	0-2	10-20	2.0-6.0	0.04-0.06	2.4-8.4	<2	Low----------	0.02	1
	2-17	15-25	0.6-2.0	0.06-0.09	7.4-8.4	<2	Low----------	0.05	
	17-20	---	---	---	---	---	----------	----	
		---	---	---	---	---	----------	----	
52*:									
Gachado---------	0-1	15-20	0.6-2.0	0.07-0.10	7.9-8.4	<2	Low----------	0.10	1
	1-7	25-30	0.2-0.6	0.06-0.08	7.9-8.4	<2	Low----------	0.15	
	7	---	---	---	---	---	----------	----	
Lomitas---------	0-1	10-20	2.0-6.0	0.06-0.09	7.4-8.4	<2	Low----------	0.05	1
	1-10	15-25	0.6-2.0	0.06-0.09	7.4-8.4	<2	Low----------	0.05	
	10	---	---	---	---	---	----------	----	
Rock outcrop.									
53---------------	0-3	50-55	0.06-0.2	0.15-0.17	7.9-8.4	2-4	High---------	0.32	5
Gadsden	3-60	50-55	0.06-0.2	0.15-0.17	7.9-8.4	2-4	High---------	0.32	
54*:									
Gila------------	0-2	12-18	0.6-2.0	0.13-0.15	7.9-8.4	<4	Low----------	0.24	5
Calcareous	2-60	8-18	0.6-2.0	0.17-0.19	7.9-8.4	<4	Low----------	0.32	
Gila------------	0-2	12-18	0.6-2.0	0.13-0.15	7.9-8.4	<4	Low----------	0.24	5
Noncalcareous	2-60	8-18	0.6-2.0	0.17-0.19	7.9-8.4	<4	Low----------	0.32	
55*, 56*:									
Gilman----------	0-5	20-27	0.2-0.6	0.16-0.18	7.9-8.4	<2	Low----------	0.43	5
Calcareous	5-43	10-15	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.55	
	43-60	10-20	0.6-2.0	0.13-0.15	7.9-8.4	<2	Low----------	0.24	
Gilman----------	0-5	20-27	0.2-0.6	0.16-0.18	7.9-8.4	<2	Low----------	0.43	5
Noncalcareous	5-43	10-15	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.55	
	43-60	10-20	0.6-2.0	0.13-0.15	7.9-8.4	<2	Low----------	0.24	
57---------------	0-11	30-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.32	5
Gilman	11-60	10-15	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.55	
58*, 59*:									
Gilman----------	0-2	20-27	0.2-0.6	0.16-0.18	7.9-8.4	<2	Low----------	0.43	5
	2-60	10-15	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.55	
Momoli----------	0-22	10-20	2.0-6.0	0.08-0.11	7.9-8.4	<4	Low----------	0.20	5
	22-60	10-20	2.0-6.0	0.05-0.10	7.9-8.4	<4	Low----------	0.10	
Denure----------	0-9	10-15	0.6-2.0	0.16-0.18	7.9-8.4	<4	Low----------	0.17	5
	9-60	10-20	2.0-6.0	0.09-0.13	7.9-8.4	<4	Low----------	0.20	
60*:									
Glenbar---------	0-6	20-27	0.6-2.0	0.16-0.18	7.9-8.4	2-4	Low----------	0.43	5
Noncalcareous	6-48	18-35	0.2-0.6	0.19-0.21	7.9-8.4	2-4	Moderate-----	0.37	
	48-60	20-30	0.6-2.0	0.14-0.16	7.9-8.4	2-4	Moderate-----	0.32	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
60*:									
Glenbar---------	0-6	20-27	0.6-2.0	0.16-0.18	7.9-8.4	2-4	Low----------	0.43	5
Calcareous	6-48	18-35	0.2-0.6	0.19-0.21	7.9-8.4	2-4	Moderate-----	0.37	
	48-60	20-30	0.6-2.0	0.14-0.16	7.9-8.4	2-4	Moderate-----	0.32	
61*, 62*:									
Gran----------	0-1	5-15	2.0-6.0	0.05-0.08	7.4-8.4	<2	Low----------	0.10	1
	1-12	40-50	0.2-0.6	0.06-0.11	7.4-8.4	<2	Moderate-----	0.15	
	12-36	---	---	---	---	---	----------	----	
	36	---	---	---	---	---	----------	----	
Wickenburg------	0-1	10-15	2.0-6.0	0.07-0.13	7.4-8.4	<2	Low----------	0.20	1
	1-12	15-25	2.0-6.0	0.05-0.12	7.4-8.4	<2	Low----------	0.05	
	12-60	---	---	---	---	---	----------	----	
63*, 64*:									
Gran----------	0-1	5-15	2.0-6.0	0.05-0.08	7.4-8.4	<2	Low----------	0.10	1
	1-12	40-50	0.2-0.6	0.06-0.11	7.4-8.4	<2	Moderate-----	0.15	
	12-36	---	---	---	---	---	----------	----	
	36	---	---	---	---	---	----------	----	
Wickenburg------	0-1	10-15	2.0-6.0	0.07-0.13	7.4-8.4	<2	Low----------	0.20	1
	1-12	15-25	2.0-6.0	0.05-0.12	7.4-8.4	<2	Low----------	0.05	
	12-60	---	---	---	---	---	----------	----	
Rock outcrop.									
65*:									
Greyeagle-------	0-5	10-18	0.6-2.0	0.06-0.09	7.9-8.4	<2	Low----------	0.24	1
	5-10	10-18	2.0-6.0	0.02-0.09	7.9-8.4	<2	Low----------	0.15	
	10	---	---	---	---	---	----------	----	
Continental-----	0-2	20-35	0.2-2.0	0.15-0.17	7.4-8.4	<2	Moderate-----	0.24	5
	2-60	35-50	0.06-0.2	0.14-0.16	7.4-8.4	<2	High---------	0.28	
Nickel----------	0-5	15-20	0.6-2.0	0.09-0.12	7.9-9.0	<2	Low----------	0.15	5
	5-60	15-25	0.2-0.6	0.11-0.13	7.9-9.0	<2	Low----------	0.15	
66*:									
Greyeagle-------	0-5	10-18	0.6-2.0	0.06-0.09	7.9-8.4	<2	Low----------	0.24	1
	5-10	10-18	2.0-6.0	0.02-0.09	7.9-8.4	<2	Low----------	0.15	
	10	---	---	---	---	---	----------	----	
Suncity Variant-	0-2	8-15	2.0-6.0	0.10-0.13	7.9-8.4	<2	Low----------	0.10	1
	2-9	25-35	0.2-0.6	0.14-0.20	7.9-8.4	<2	Moderate-----	0.20	
	9	---	---	---	---	---	----------	----	
67--------------	0-2	40-50	0.06-0.2	0.14-0.16	7.4-8.4	<4	High---------	0.32	5
Guest	2-60	35-50	0.06-0.2	0.14-0.19	7.4-8.4	<4	High---------	0.32	
68*, 69*:									
Gunsight--------	0-1	10-15	2.0-6.0	0.03-0.08	7.9-8.4	2-4	Low----------	0.10	5
	1-60	15-25	0.6-2.0	0.04-0.12	7.9-8.4	2-4	Low----------	0.10	
Cipriano--------	0-6	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low----------	0.20	1
	6	---	---	---	---	---	----------	----	
70*, 71*:									
Gunsight--------	0-11	15-25	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low----------	0.15	5
	11-60	15-25	0.6-2.0	0.04-0.12	7.9-8.4	2-4	Low----------	0.10	
Rillito---------	0-12	10-18	0.6-2.0	0.10-0.13	7.9-8.4	2-4	Low----------	0.32	5
	12-36	10-15	0.6-2.0	0.08-0.13	7.9-8.4	2-4	Low----------	0.28	
	36-60	10-20	0.6-2.0	0.05-0.10	7.9-8.4	2-4	Low----------	0.10	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
72*:									
Lehmans---------	0-2	27-35	0.2-0.6	0.12-0.17	6.6-8.4	<2	Moderate-----	0.05	1
	2-20	35-55	0.06-0.2	0.10-0.15	6.6-8.4	<2	High---------	0.10	
	20	---	---	---	---	---	----------	----	
Rock outcrop.									
73*:									
Lehmans---------	0-2	27-35	0.2-0.6	0.12-0.17	6.6-8.4	<2	Moderate-----	0.05	1
	2-20	35-55	0.06-0.2	0.10-0.15	6.6-8.4	<2	High---------	0.10	
	20	---	---	---	---	---	----------	----	
Rock outcrop.									
74*:									
Luke------------	0-1	20-25	0.2-0.6	0.07-0.10	7.4-8.4	<2	Low----------	0.37	2
	1-28	40-55	0.06-0.2	0.05-0.10	7.4-8.4	<2	Moderate-----	0.32	
	28-34	---	---	---	---	---	----------	----	
	34-60	---	---	---	---	---	----------	----	
Cipriano--------	0-6	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low----------	0.20	1
	6-20	---	---	---	---	---	----------	----	
75---------------	0-7	20-35	0.2-0.6	0.16-0.21	7.9-8.4	<4	Moderate-----	0.32	5
Mohall	7-60	25-35	0.2-0.6	0.14-0.21	7.9-8.4	<4	Moderate-----	0.28	
76---------------	0-7	20-25	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.32	5
Mohall	7-60	25-35	0.2-0.6	0.14-0.21	7.9-8.4	<2	Moderate-----	0.28	
77---------------	0-2	20-35	0.2-0.6	0.16-0.21	7.9-8.4	<4	Moderate-----	0.32	5
Mohall	2-42	25-35	0.2-0.6	0.14-0.21	7.9-8.4	<4	Moderate-----	0.28	
	42-60	5-10	6.0-2.0	0.02-0.04	7.9-8.4	<4	Low----------	0.05	
78---------------	0-6	30-40	0.2-0.6	0.17-0.20	7.9-8.4	<2	Moderate-----	0.32	5
Mohall	6-60	25-35	0.2-0.6	0.14-0.21	7.9-8.4	<2	Moderate-----	0.28	
79---------------	0-12	40-50	0.06-0.2	0.14-0.16	7.9-8.4	<4	High---------	0.24	5
Mohall	12-60	25-35	0.2-0.6	0.14-0.21	7.9-8.4	<4	Moderate-----	0.28	
80*, 81*:									
Mohall----------	0-2	20-35	0.2-0.6	0.16-0.21	7.9-8.4	<4	Moderate-----	0.32	5
	2-42	25-35	0.2-0.6	0.14-0.21	7.9-8.4	<4	Moderate-----	0.28	
	42-60	5-10	6.0-2.0	0.02-0.04	7.9-8.4	<4	Low----------	0.05	
Tremant---------	0-1	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
	1-5	30-35	0.2-0.6	0.12-0.21	7.9-8.4	<4	Moderate-----	0.28	
	5-29	15-30	0.6-2.0	0.10-0.15	7.9-8.4	<4	Low----------	0.32	
	29-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
82---------------	0-2	10-20	2.0-6.0	0.09-0.13	6.6-8.4	<2	Low----------	0.20	5
Mohave	2-20	20-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.28	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
83---------------	0-2	20-27	0.2-0.6	0.16-0.20	6.6-8.4	<2	Moderate-----	0.24	5
Mohave	2-20	20-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.28	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
84---------------	0-2	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	5
Mohave	2-28	20-35	0.2-0.6	0.16-0.19	7.9-8.4	<2	Moderate-----	0.24	
	28-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
85---------------	0-6	30-40	0.2-0.6	0.19-0.21	7.9-8.4	<2	High---------	0.32	5
Mohave	6-20	27-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.28	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
86---------------	0-2	27-40	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.32	5
Mohave	2-60	20-35	0.2-0.6	0.16-0.19	7.9-8.4	<2	Moderate-----	0.24	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
87*:									
Mohave----------	0-2	10-20	2.0-6.0	0.09-0.13	6.6-8.4	<2	Low----------	0.20	5
Calcareous	2-20	20-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.28	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
Mohave----------	0-2	10-18	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low----------	0.20	5
Noncalcareous	2-20	20-35	0.2-0.6	0.16-0.19	7.9-8.4	<2	Moderate-----	0.24	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
88*:									
Mohave----------	0-2	10-20	2.0-6.0	0.09-0.13	6.6-8.4	<2	Low----------	0.20	5
	2-20	20-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.28	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
Guest-----------	0-2	30-40	0.2-0.6	0.19-0.21	7.4-8.4	<4	Moderate-----	0.37	5
	2-60	35-50	0.06-0.2	0.14-0.19	7.4-8.4	<4	High---------	0.32	
89*:									
Mohave----------	0-2	30-40	0.2-0.6	0.19-0.21	7.9-8.4	<2	High---------	0.32	5
	2-20	20-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate-----	0.28	
	20-60	15-20	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low----------	0.37	
Tres Hermanos---	0-2	10-25	0.6-2.0	0.10-0.17	7.4-8.4	<2	Low----------	0.24	5
	2-20	20-30	0.2-0.6	0.10-0.17	7.4-8.4	2-4	Moderate-----	0.24	
	20-60	15-25	0.6-2.0	0.06-0.08	7.9-8.4	2-4	Low----------	0.20	
90----------	0-3	10-20	2.0-6.0	0.08-0.11	7.9-8.4	<4	Low----------	0.20	5
Momoli	3-60	10-20	2.0-6.0	0.05-0.10	7.9-8.4	<4	Low----------	0.10	
91*:									
Momoli----------	0-1	10-15	2.0-6.0	0.04-0.08	7.9-8.4	<4	Low----------	0.10	5
	1-60	10-20	2.0-6.0	0.05-0.10	7.9-8.4	<4	Low----------	0.10	
Carrizo---------	0-11	5-15	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low----------	0.05	5
	11-60	3-8	>20	0.03-0.05	7.4-8.4	<2	Low----------	0.02	
92*:									
Momoli----------	0-1	10-15	2.0-6.0	0.04-0.08	7.9-8.4	<4	Low----------	0.10	5
	1-60	10-20	2.0-6.0	0.05-0.10	7.9-8.4	<4	Low----------	0.10	
Carrizo---------	0-11	5-15	2.0-6.0	0.04-0.08	7.9-8.4	<2	Low----------	0.05	5
	11-60	10-20	2.0-6.0	0.04-0.10	7.9-8.4	<2	Low----------	0.02	
93*, 94*:									
Nickel----------	0-1	10-18	2.0-6.0	0.06-0.08	7.9-9.0	<2	Low----------	0.10	5
	1-10	10-20	0.6-2.0	0.13-0.15	7.9-9.0	<2	Low----------	0.24	
	10-60	10-18	2.0-6.0	0.06-0.08	7.9-9.0	<2	Low----------	0.10	
Cave----------	0-1	10-15	0.6-2.0	0.07-0.12	7.4-8.4	2-4	Low----------	0.24	1
	1-14	10-15	0.6-2.0	0.13-0.16	7.4-8.4	2-4	Low----------	0.28	
	14-20	---	---	---	---	---	----------	----	
	20-60	2-5	2.0-6.0	0.04-0.06	7.9-8.4	2-4	Low----------	0.10	
95----------	0-2	20-27	0.6-2.0	0.13-0.15	7.9-8.4	<2	Moderate-----	0.24	4
Ohaco	2-27	35-45	0.06-0.2	0.14-0.20	7.9-8.4	<2	High---------	0.32	
	27-31	10-20	0.6-2.0	0.10-0.12	7.9-8.4	<2	Low----------	0.17	
	31	---	---	---	---	---	----------	----	
96*, 97*:									
Pinaleno--------	0-1	30-40	0.2-0.6	0.12-0.14	7.9-8.4	<2	Moderate-----	0.10	5
	1-12	30-40	0.2-0.6	0.12-0.16	7.9-8.4	<2	Moderate-----	0.10	
	12-60	15-25	0.6-2.0	0.13-0.16	7.9-8.4	<2	Low----------	0.17	
Tres Hermanos---	0-2	10-25	0.6-2.0	0.10-0.17	7.4-8.4	<2	Low----------	0.24	5
	2-22	20-30	0.2-0.6	0.10-0.17	7.4-8.4	2-4	Moderate-----	0.24	
	22-60	15-25	0.6-2.0	0.06-0.08	7.9-8.4	2-4	Low----------	0.20	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
98*, 99*:									
Pinamt	0-1	10-15	2.0-6.0	0.03-0.08	7.9-8.4	2-4	Low	0.05	5
	1-28	20-30	0.2-0.6	0.03-0.11	7.9-8.4	2-4	Low	0.15	
	28-60	15-25	2.0-6.0	0.03-0.10	7.9-8.4	2-4	Low	0.15	
Tremant	0-5	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low	0.32	5
	5-29	30-35	0.2-0.6	0.12-0.21	7.9-8.4	<4	Moderate	0.28	
	29-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low	0.05	
100*:									
Quilotosa	0-2	5-15	2.0-6.0	0.03-0.05	7.9-8.4	<2	Low	0.02	1
	2-14	5-20	2.0-6.0	0.04-0.07	7.9-8.4	<2	Low	0.05	
	14-18	---	---	---	---	---	---	---	
	18	---	---	---	---	---	---	---	
Vaiva	0-3	10-15	2.0-6.0	0.06-0.08	7.4-8.4	<2	Low	0.02	1
	3-11	20-35	0.6-2.0	0.04-0.10	7.4-8.4	<2	Low	0.17	
	11-17	---	---	---	---	---	---	---	
	17	---	---	---	---	---	---	---	
Rock outcrop.									
101	0-11	10-18	0.6-2.0	0.13-0.18	7.9-8.4	2-4	Low	0.28	5
Rillito	11-39	15-25	0.6-2.0	0.12-0.18	7.9-8.4	2-4	Low	0.32	
	39-60	10-20	0.6-2.0	0.05-0.10	7.9-8.4	2-4	Low	0.10	
102	0-14	10-18	0.6-2.0	0.10-0.13	7.9-8.4	2-4	Low	0.32	5
Rillito	14-60	15-25	0.6-2.0	0.12-0.18	7.9-8.4	2-4	Low	0.32	
103*:									
Rock outcrop.									
Gachado	0-1	15-20	0.6-2.0	0.07-0.10	7.9-8.4	<2	Low	0.10	1
	1-7	25-30	0.2-0.6	0.06-0.08	7.9-8.4	<2	Low	0.15	
	7	---	---	---	---	---	---	---	
104*, 105*:									
Rock outcrop.									
Lehmans	0-2	27-35	0.2-0.6	0.12-0.17	6.6-8.4	---	Moderate	0.05	1
	2-15	35-55	0.06-0.2	0.10-0.15	6.6-8.4	---	High	0.10	
	15-20	27-35	0.2-0.6	0.12-0.17	6.6-8.4	---	Moderate	0.05	
	20	---	---	---	---	---	---	---	
106*, 107*:									
Sal	0-2	15-25	0.6-2.0	0.02-0.04	7.9-8.4	2-8	Low	0.05	1
	2-20	28-35	0.2-0.6	0.01-0.02	7.9-9.0	>4	Moderate	0.05	
	20	---	---	---	---	---	---	---	
Cipriano	0-20	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low	0.20	1
	20	---	---	---	---	---	---	---	
108*, 109*:									
Schenco	0-2	20-27	0.6-2.0	0.03-0.05	6.6-8.4	<4	Low	0.05	1
	2-11	12-30	0.6-2.0	0.05-0.10	7.9-9.0	<4	Low	0.15	
	11-22	---	---	---	---	---	---	---	
Rock outcrop.									
110*:									
Suncity	0-1	15-25	0.6-2.0	0.12-0.15	7.9-8.4	<2	Low	0.20	1
	1-9	25-35	0.06-0.2	0.16-0.18	7.9-8.4	<2	Moderate	0.32	
	9-60	---	---	---	---	---	---	---	
Cipriano	0-6	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low	0.20	1
	6	---	---	---	---	---	---	---	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
111. Torriorthents									
112*:									
Tremant---------	0-9	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
Noncalcareous	9-41	30-35	0.2-0.6	0.12-0.21	7.9-8.4	<4	Moderate-----	0.28	
	41-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
Tremant---------	0-9	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
Calcareous	9-41	30-35	0.2-0.6	0.12-0.21	7.9-8.4	<4	Moderate-----	0.28	
	41-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
113*, 114*:									
Tremant---------	0-9	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
Calcareous	9-41	15-30	0.2-0.6	0.10-0.15	7.9-8.4	<4	Low----------	0.32	
	41-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
Tremant---------	0-9	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
Noncalcareous	9-41	15-30	0.2-0.6	0.10-0.15	7.9-8.4	<4	Low----------	0.32	
	41-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
115*:									
Tremant---------	0-9	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
	9-41	15-30	0.2-0.6	0.10-0.15	7.9-8.4	<4	Low----------	0.32	
	41-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
Antho-----------	0-3	5-15	2.0-6.0	0.10-0.12	7.9-8.4	<4	Low----------	0.20	5
	3-60	5-15	2.0-6.0	0.08-0.12	7.9-8.4	<4	Low----------	0.20	
116*, 117*:									
Tremant---------	0-2	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
	2-26	30-35	0.2-0.6	0.12-0.21	7.9-8.4	<4	Moderate-----	0.28	
	26-60	15-30	0.6-2.0	0.10-0.15	7.9-8.4	<4	Low----------	0.32	
Gunsight--------	0-10	10-15	2.0-6.0	0.03-0.08	7.9-8.4	2-4	Low----------	0.10	5
	10-60	10-20	0.6-2.0	0.04-0.10	7.9-8.4	2-4	Low----------	0.10	
Rillito---------	0-2	10-18	0.6-2.0	0.10-0.13	7.9-8.4	2-4	Low----------	0.32	5
	2-60	15-25	0.6-2.0	0.12-0.18	7.9-8.4	2-4	Low----------	0.32	
118*:									
Tremant---------	0-9	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
	9-41	15-30	0.2-0.6	0.10-0.15	7.9-8.4	<4	Low----------	0.32	
	41-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
Rillito---------	0-12	10-18	0.6-2.0	0.10-0.13	7.9-8.4	2-4	Low----------	0.32	5
	12-36	10-15	0.6-2.0	0.08-0.13	7.9-8.4	2-4	Low----------	0.28	
	36-60	10-20	0.6-2.0	0.05-0.10	7.9-8.4	2-4	Low----------	0.10	
119*:									
Tremant---------	0-9	10-20	0.6-2.0	0.08-0.18	7.9-8.4	<4	Low----------	0.32	5
	9-41	15-30	0.2-0.6	0.10-0.15	7.9-8.4	<4	Low----------	0.32	
	41-60	3-5	>20	0.04-0.06	7.9-8.4	<4	Low----------	0.05	
Suncity---------	0-2	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low----------	0.10	1
	2-12	25-35	0.06-0.2	0.16-0.18	7.9-8.4	<2	Moderate-----	0.32	
	12-60	---	---	---	---	---	----------	----	
120*:									
Tres Hermanos---	0-2	10-25	2.0-6.0	0.10-0.17	7.4-8.4	<2	Low----------	0.15	5
Noncalcareous	2-22	30-35	0.2-0.6	0.10-0.17	7.4-8.4	2-4	Moderate-----	0.24	
	22-60	15-25	0.6-2.0	0.06-0.08	7.9-8.4	2-4	Low----------	0.20	
Tres Hermanos---	0-2	10-25	2.0-6.0	0.10-0.17	7.4-8.4	<2	Low----------	0.15	5
Calcareous	2-22	30-35	0.2-0.6	0.10-0.17	7.4-8.4	2-4	Moderate-----	0.24	
	22-60	15-25	0.6-2.0	0.06-0.08	7.9-8.4	2-4	Low----------	0.20	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
								K	T
	In	Pct	In/hr		pH	Mmhos/cm			
121*:									
Tres Hermanos---	0-2	10-25	0.6-2.0	0.10-0.17	7.4-8.4	<2	Low----------	0.28	5
	2-22	30-35	0.2-0.6	0.10-0.17	7.4-8.4	2-4	Moderate-----	0.24	
	22-60	15-25	0.6-2.0	0.06-0.08	7.9-8.4	2-4	Low----------	0.20	
Anthony---------	0-2	5-20	2.0-6.0	0.11-0.14	7.9-8.4	<4	Low----------	0.24	5
	2-40	0-15	2.0-6.0	0.05-0.08	7.9-8.4	<4	Low----------	0.15	
	40-60	20-27	0.6-2.0	0.16-0.18	7.9-8.4	<4	Low----------	0.43	
122----------	0-2	8-18	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low----------	0.15	5
Vado	2-60	8-18	2.0-6.0	0.04-0.08	7.4-8.4	<2	Low----------	0.10	
123----------	0-3	15-25	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low----------	0.20	1
Vaiva	3-11	20-35	0.6-2.0	0.04-0.10	7.4-8.4	<2	Low----------	0.17	
	11-17	---	---	---	---	---	----------	----	
	17	---	---	---	---	---	----------	----	
124*:									
Valencia--------	0-20	10-15	2.0-6.0	0.11-0.13	7.9-8.4	2-4	Low----------	0.20	5
Noncalcareous	20-60	20-30	0.2-0.6	0.19-0.21	7.9-8.4	2-4	Moderate-----	0.32	
Valencia--------	0-20	10-15	2.0-6.0	0.11-0.13	7.9-8.4	2-4	Low----------	0.20	5
Calcareous	20-60	20-30	0.2-0.6	0.19-0.21	7.9-8.4	2-4	Moderate-----	0.32	
125----------	0-60	5-10	2.0-6.0	0.09-0.11	7.9-8.4	2-4	Low----------	0.10	5
Vint									

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and such terms as "rare" and "brief" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
1*, 2*:										
Antho	B	Rare	---	---	>60	---	---	---	High	Low.
Noncalcareous										
Antho	B	Rare	---	---	>60	---	---	---	High	Low.
Calcareous										
3*, 4*:										
Antho	B	Rare	---	---	>60	---	---	---	High	Low.
Carrizo	A	Occasional	Very brief	Jun-Oct	>60	---	---	---	High	Low.
Maripo	B	Rare	---	---	>60	---	---	---	High	Low.
5----	B	Rare	---	---	>60	---	---	---	High	Low.
Anthony										
6*, 7*:										
Anthony	B	Rare	---	---	>60	---	---	---	High	Low.
Arizo	A	Occasional	Brief	Jul-Sep	>60	---	---	---	High	Low.
8----	A	Occasional	Brief	Jul-Sep	>60	---	---	---	High	Low.
Arizo										
9*:										
Beeline	D	None	---	---	5-20	Soft	---	---	High	Low.
Cipriano	D	None	---	---	>60	---	4-20	Thick	High	Low.
10*, 11*:										
Brios	A	Occasional	Brief	Jun-Oct	>60	---	---	---	High	Low.
Carrizo	A	Occasional	Very brief	Jun-Oct	>60	---	---	---	High	Low.
12----	D	None	---	---	>60	---	---	---	High	Low.
Carefree										
13*:										
Carefree	D	None	---	---	>60	---	---	---	High	Low.
Beardsley	C	None	---	---	>60	---	20-40	Thick	High	Low.
14----	A	Rare	---	---	>60	---	---	---	High	Low.
Carrizo										
15*:										
Carrizo	A	None	---	---	>60	---	---	---	High	Low.
Gunsight	B	None	---	---	>60	---	---	---	High	Low.
16*, 17*:										
Cellar	D	None	---	---	2-14	Hard	---	---	High	Low.
Rock outcrop.										
18*:										
Cherioni	D	None	---	---	4-36	Hard	2-20	Thick	High	Low.
Rock outcrop.										

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
19*, 20*: Chuckawalla	B	None	---	---	>60	---	---	---	High	Moderate.
Gunsight	B	None	---	---	>60	---	---	---	High	Low.
21--Cipriano	D	None	---	---	>60	---	4-20	Thick	High	Low.
22, 23--Contine	C	None	---	---	>60	---	---	---	High	Low.
24, 25, 26--Continental	C	None	---	---	>60	---	---	---	High	Low.
27*: Continental	C	None	---	---	>60	---	---	---	High	Low.
Mohave	B	None	---	---	>60	---	---	---	High	Low.
28*: Continental	C	None	---	---	>60	---	---	---	High	Low.
Ohaco	C	None	---	---	>60	---	20-40	Thick	High	Low.
29*, 30*: Denure	B	None	---	---	>60	---	---	---	High	Low.
Momoli	B	None	---	---	>60	---	---	---	High	Low.
Carrizo	A	None	---	---	>60	---	---	---	High	Low.
31*, 32*: Dixaleta	D	None	---	---	3-11	Soft	---	---	High	Low.
Rock outcrop.										
33, 34, 35--Eba	C	None	---	---	>60	---	---	---	High	Low.
36*: Eba	C	None	---	---	>60	---	---	---	High	Low.
Continental	C	None	---	---	>60	---	---	---	High	Low.
37*, 38*: Eba	C	None	---	---	>60	---	---	---	High	Low.
Continental	C	None	---	---	>60	---	---	---	High	Low.
Cave	D	None	---	---	>60	---	8-19	Thick	High	Low.
39*: Eba	C	None	---	---	>60	---	---	---	High	Low.
Nickel	B	None	---	---	>60	---	---	---	High	Low.
Cave	D	None	---	---	>60	---	8-19	Thick	High	Low.
40*, 41*, 42*, 43*: Eba	C	None	---	---	>60	---	---	---	High	Low.
Pinaleno	B	None	---	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
44, 45---------- Ebon	C	None--------	---	---	>60	---	---	---	High-----	Low.
46*:										
Ebon----------	C	None--------	---	---	>60	---	---	---	High-----	Low.
Contine----------	C	None--------	---	---	>60	---	---	---	High-----	Low.
7*:										
Ebon----------	C	None--------	---	---	>60	---	---	---	High-----	Low.
Gunsight----------	B	None--------	---	---	>60	---	---	---	High-----	Low.
Cipriano----------	D	None--------	---	---	>60	---	4-20	Thick	High-----	Low.
48*, 49*:										
Ebon----------	C	None--------	---	---	>60	---	---	---	High-----	Low.
Pinamt----------	B	None--------	---	---	>60	---	---	---	High-----	Low.
50*:										
Estrella--------- Calcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
Estrella--------- Noncalcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
51*:										
Gachado----------	D	None--------	---	---	9-20	Hard	---	---	High-----	Low.
Lomitas----------	D	None--------	---	---	4-20	Hard	---	---	High-----	Low.
52*:										
Gachado----------	D	None--------	---	---	7-20	Hard	---	---	High-----	Low.
Lomitas----------	D	None--------	---	---	4-20	Hard	---	---	High-----	Low.
Rock outcrop.										
53---------- Gadsden	D	Rare--------	---	---	>60	---	---	---	High-----	Low.
54*:										
Gila---------- Noncalcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
Gila---------- Calcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
55*, 56*:										
Gilman---------- Noncalcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
Gilman---------- Calcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
57---------- Gilman	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
58*, 59*:										
Gilman----------	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
Momoli----------	B	None--------	---	---	>60	---	---	---	High-----	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
58*,59*: Denure	B	None	---	---	>60	---	---	---	High	Low.
60*: Glenbar Noncalcareous	B	Rare	---	---	>60	---	---	---	High	Low.
Glenbar Calcareous	B	Rare	---	---	>60	---	---	---	High	Low.
61*, 62*: Gran	D	None	---	---	20-40	Hard	---	---	High	Low.
Wickenburg	D	None	---	---	3-20	Soft	---	---	High	Low.
63*, 64*: Gran	D	None	---	---	20-40	Hard	---	---	High	Low.
Wickenburg	D	None	---	---	3-20	Soft	---	---	High	Low.
Rock outcrop.										
65*: Greyeagle	D	None	---	---	>60	---	4-20	Thick	High	Low.
Continental	C	None	---	---	>60	---	---	---	High	Low.
Nickel	B	None	---	---	>60	---	---	---	High	Low.
66*: Greyeagle	D	None	---	---	>60	---	4-20	Thick	High	Low.
Suncity Variant	D	None	---	---	>60	---	5-20	Thick	High	Low.
67--- Guest	D	Rare	---	---	>60	---	---	---	High	Low.
68*, 69*: Gunsight	B	None	---	---	>60	---	---	---	High	Low.
Cipriano	D	None	---	---	>60	---	5-20	Thick	High	Low.
70*, 71*: Gunsight	B	None	---	---	>60	---	---	---	High	Low.
Rillito	B	None	---	---	>60	---	---	---	High	Low.
72*, 73*: Lehmans	D	None	---	---	6-20	Hard	---	---	High	Low.
Rock outcrop.										
74*: Luke	C	None	---	---	>60	---	20-40	Thick	High	Low.
Cipriano	D	None	---	---	>60	---	4-20	Thick	High	Low.
75, 76, 77, 78, 79--- Mohall	B	None	---	---	>60	---	---	---	High	Low.
80*, 81*: Mohall	B	None	---	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
80*, 81*: Tremant	B	None	---	---	>60	---	---	---	High	Low.
82, 83, 84, 85, 86---------- Mohave	B	None	---	---	>60	---	---	---	High	Low.
87*: Mohave Noncalcareous	B	None	---	---	>60	---	---	---	High	Low.
Mohave Calcareous	B	None	---	---	>60	---	---	---	High	Low.
88*: Mohave	B	None	---	---	>60	---	---	---	High	Low.
Guest	D	Rare	---	---	>60	---	---	---	High	Low.
89*: Mohave	B	None	---	---	>60	---	---	---	High	Low.
Tres Hermanos	B	None	---	---	>60	---	---	---	High	Low.
90---------- Momoli	B	None	---	---	>60	---	---	---	High	Low.
91*: Momoli	B	None	---	---	>60	---	---	---	High	Low.
Carrizo	A	None	---	---	>60	---	---	---	High	Low.
92*: Momoli	B	None	---	---	>60	---	---	---	High	Low.
Carrizo	A	None	---	---	>60	---	---	---	High	Low.
93*, 94*: Nickel	B	None	---	---	>60	---	---	---	High	Low.
Cave	D	None	---	---	>60	---	4-20	Thick	High	Low.
95---------- Ohaco	C	None	---	---	>60	---	20-40	Thick	High	Low.
96*, 97*: Pinaleno	B	None	---	---	>60	---	---	---	High	Low.
Tres Hermanos	B	None	---	---	>60	---	---	---	High	Low.
98*, 99*: Pinamt	B	None	---	---	>60	---	---	---	High	Low.
Tremant	B	None	---	---	>60	---	---	---	High	Low.
100*: Quilotosa	D	None	---	---	4-16	Hard	---	---	High	Low.
Vaiva	D	None	---	---	5-20	Hard	---	---	High	Low.
Rock outcrop.										
101, 102---------- Rillito	B	None	---	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
103*: Rock outcrop.										
Gachado	D	None	---	---	7-20	Hard	---	---	High	Low.
104*, 105*: Rock outcrop.										
Lehmans	D	None	---	---	6-20	Hard	---	---	High	Low.
106*, 107*:										
Sal	D	None	---	---	>60	---	9-20	Thick	High	Low.
Cipriano	D	None	---	---	>60	---	4-20	Thick	High	Low.
108*, 109*:										
Schenco	D	None	---	---	10-20	Soft	---	---	High	Low.
Rock outcrop.										
110*:										
Suncity	D	None	---	---	>60	---	5-20	Thick	High	Low.
Cipriano	D	None	---	---	>60	---	4-20	Thick	High	Low.
111. Torriorthents										
112*, 113*, 114*:										
Tremant Noncalcareous	B	None	---	---	>60	---	---	---	High	Low.
Tremant Calcareous	B	None	---	---	>60	---	---	---	High	Low.
115*:										
Tremant	B	None	---	---	>60	---	---	---	High	Low.
Antho	B	Rare	---	---	>60	---	---	---	High	Low.
116*, 117*:										
Tremant	B	None	---	---	>60	---	---	---	High	Low.
Gunsight	B	None	---	---	>60	---	---	---	High	Low.
Rillito	B	None	---	---	>60	---	---	---	High	Low.
118*:										
Tremant	B	None	---	---	>60	---	---	---	High	Low.
Rillito	B	None	---	---	>60	---	---	---	High	Low.
119*:										
Tremant	B	None	---	---	>60	---	---	---	High	Low.
Suncity	D	None	---	---	>60	---	5-20	Thick	High	Low.
120*:										
Tres Hermanos Noncalcareous	B	None	---	---	>60	---	---	---	High	Low.
Tres Hermanos Calcareous	B	None	---	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
121*:										
Tres Hermanos----	B	None--------	---	---	>60	---	---	---	High-----	Low.
Anthony----------	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
122---------- Vado	B	None--------	---	---	>60	---	---	---	High-----	Low.
123---------- Vaiva	D	None--------	---	---	5-20	Hard	---	---	High-----	Low.
124*:										
Valencia--------- Noncalcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
Valencia--------- Calcareous	B	Rare--------	---	---	>60	---	---	---	High-----	Low.
125---------- Vint	B	Rare--------	---	---	>60	---	---	---	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Antho	Coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents
Anthony	Coarse-loamy, mixed (calcareous), thermic Typic Torrifluvents
Arizo	Sandy-skeletal, mixed, thermic Typic Torriorthents
Beardsley	Fine, mixed, hyperthermic Typic Durargids
Beeline	Loamy, mixed (calcareous), hyperthermic, shallow Typic Torriorthents
Brios	Sandy, mixed, hyperthermic Typic Torrifluvents
Carefree	Fine, mixed, hyperthermic Vertic Haplargids
Carrizo	Sandy-skeletal, mixed, hyperthermic Typic Torriorthents
Cave	Loamy, mixed, thermic, shallow Typic Paleorthids
Cellar	Loamy-skeletal, mixed, nonacid, thermic Lithic Torriorthents
Cherioni	Loamy-skeletal, mixed, hyperthermic, shallow Typic Durorthids
Chuckawalla	Loamy-skeletal, mixed, hyperthermic Typic Haplargids
Cipriano	Loamy-skeletal, mixed, hyperthermic, shallow Typic Durorthids
Contine	Fine, mixed, hyperthermic Typic Haplargids
Continental	Fine, mixed, thermic Typic Haplargids
Denure	Coarse-loamy, mixed, hyperthermic Typic Camborthids
Dixaleta	Loamy-skeletal, mixed (calcareous), thermic, shallow Typic Torriorthents
Eba	Clayey-skeletal, mixed, thermic Typic Haplargids
Ebon	Clayey-skeletal, mixed, hyperthermic Typic Haplargids
Estrella	Fine-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents
Gachado	Loamy-skeletal, mixed, hyperthermic Lithic Haplargids
Gadsden	Fine, montmorillonitic (calcareous), hyperthermic Vertic Torrifluvents
Gila	Coarse-loamy, mixed (calcareous), thermic Typic Torrifluvents
Gilman	Coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents
Glenbar	Fine-silty, mixed (calcareous), hyperthermic Typic Torrifluvents
Gran	Clayey-skeletal, mixed, thermic, shallow Typic Haplargids
Greyeagle	Loamy-skeletal, mixed, thermic, shallow Typic Durorthids
Guest	Fine, mixed (calcareous), thermic Vertic Torrifluvents
Gunsight	Loamy-skeletal, mixed, hyperthermic Typic Calciorthids
Lehmans	Clayey, montmorillonitic, thermic Lithic Haplargids
Lomitas	Loamy-skeletal, mixed, hyperthermic Lithic Camborthids
Luke	Clayey-skeletal, mixed, hyperthermic Typic Durargids
Maripo	Coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents
Mohall	Fine-loamy, mixed, hyperthermic Typic Haplargids
Mohave	Fine-loamy, mixed, thermic Typic Haplargids
Momoli	Loamy-skeletal, mixed, hyperthermic Typic Camborthids
Nickel	Loamy-skeletal, mixed, thermic Typic Calciorthids
Ohaco	Fine, mixed, thermic Typic Durargids
Pinaleno	Loamy-skeletal, mixed, thermic Typic Haplargids
Pinamt	Loamy-skeletal, mixed, hyperthermic Typic Haplargids
Quilotosa	Loamy-skeletal, mixed (calcareous), hyperthermic Lithic Torriorthents
Rillito	Coarse-loamy, mixed, hyperthermic Typic Calciorthids
Sal	Loamy-skeletal, mixed, hyperthermic, shallow Typic Durargids
Schenco	Loamy-skeletal, mixed (calcareous), hyperthermic, shallow Typic Torriorthents
Suncity	Loamy, mixed, hyperthermic, shallow Typic Durargids
Suncity Variant	Loamy, mixed, thermic, shallow Typic Durargids
Torriorthents	Torriorthents
Tremant	Fine-loamy, mixed, hyperthermic Typic Haplargids
Tres Hermanos	Fine-loamy, mixed, thermic Typic Haplargids
Vado	Loamy-skeletal, mixed, thermic Typic Camborthids
Vaiva	Loamy-skeletal, mixed, hyperthermic Lithic Haplargids
Valencia	Coarse-loamy, mixed (calcareous), hyperthermic Typic Torrifluvents
Vint	Sandy, mixed, hyperthermic Typic Torrifluvents
Wickenburg	Loamy-skeletal, mixed, thermic, shallow Typic Camborthids

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