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In cooperation with
United States Department
of the Interior, Bureau of
Land Management,
East Maricopa Natural
Resource Conservation
District, Florence-Coolidge
Natural Resource
Conservation District,
Winkelman Natural
Resource Conservation
District; and Arizona
Agricultural Experiment
Station

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona



How To Use This Soil Survey

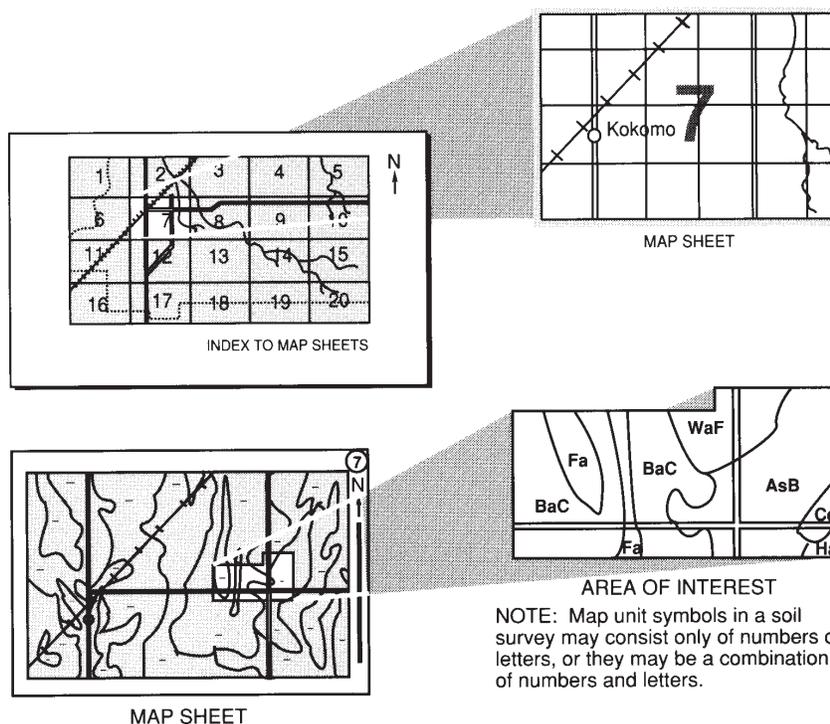
Detailed Soil Maps

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

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

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

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



This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in June, 2008. Soil names and descriptions were approved in July, 2008. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2008. This survey was made cooperatively by the Natural Resources Conservation Service and the United States Department of Interior, Bureau of Land Management; East Maricopa, Florence-Coolidge, and Winkelman Natural Resources Conservation Districts; and the Arizona Agricultural Experiment Station. The survey is part of the technical assistance furnished to the East Maricopa, Florence-Coolidge, and Winkelman Natural Resources 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.

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Cover: Top left—Typical area of a fan terrace in the Beardsley-Hickiwan complex, 1 to 8 percent slopes.

Top right—Lupines and Mexican poppies in an area of Gran-Rock outcrop-Pantano complex, 20 to 60 percent slopes.

Bottom left—Looking north along the Gila River on the Battle Axe Road, a typical area of low rolling schist hills with a springtime bloom of Mexican poppies; in the Wikieup family very channery sandy loam, 10 to 60 percent slopes.

Bottom right—Sasabe-Stronghold complex, 1 to 15 percent slopes, in an area north of Catalina, Arizona, on Highway 77.

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

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Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists 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 ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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

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

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

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Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

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United States Department of Agriculture, Natural Resources Conservation Service, In cooperation with the United States Department of the Interior, Bureau of Land Management, East Maricopa Natural Resources Conservation District, Florence-Coolidge Natural Resources Conservation District, Winkelman Natural Resources Conservation District, and Arizona Agricultural Experiment Station

This survey area is in south central Arizona (fig. 1). Its boundary extends from the Tonto National Forest and Superior in the north to the Catalina Mountains in the

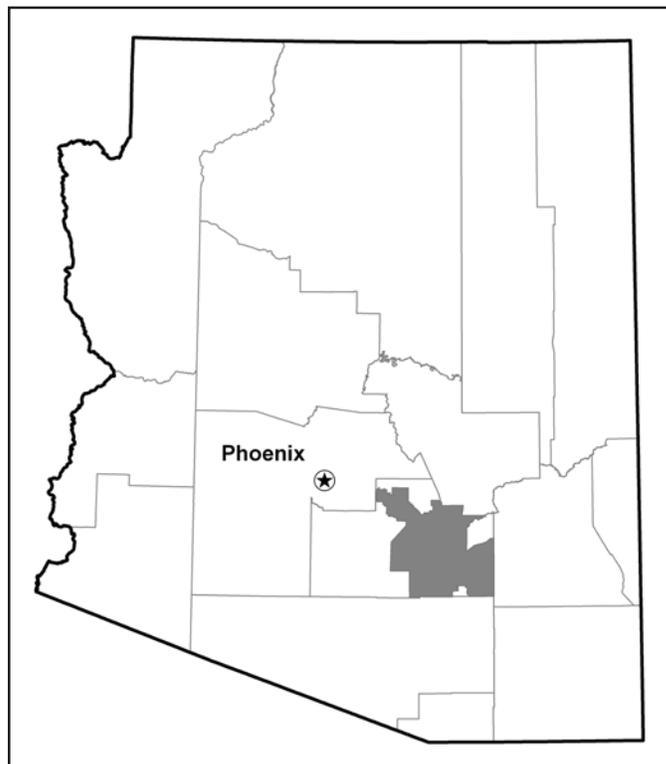


Figure 1.—Location of Eastern Pinal and Southern Gila Counties in Arizona.

south, and from Red Rock and Florence in the east to the Pinal-Graham County line, which forms the western border. The survey area comprises about 1,699,900 acres.

General Nature of the Area

The survey area is part of the Sonoran and Southern Arizona Desert section of the Basin and Range Physiographic Province, which is characterized by north-south trending ranges of mountains with broad basins or valleys between the mountains. The survey area has a complex variety of terrain and soils. The vegetation ranges from that of desert shrub land to that of pine woodland. Elevation ranges from 1,500 feet at Florence, Arizona, to 7,000 feet in the Galiuro Mountains. The annual precipitation ranges from 7 to 20 inches. The mean annual air temperature ranges from 50 to 72 degrees F.

The survey has two major drainage systems. The San Pedro flows north out of Mexico. It is a perennial-intermittent river; certain sections of the river have water throughout the year, and other sections have running water only after periods of rainfall. The San Pedro River is one of the longest naturally occurring riparian areas left in the Southwest. The San Pedro drains into the Gila River at Winkelman, Arizona. The Gila River is fed from water stored in the San Carlos Reservoir, which is used for irrigation water.

Ranching, farming, and mining are the main enterprises in the survey area. The major crops are cotton, alfalfa hay, and wheat. Sand and gravel, copper, gypsum, and diatomite are mined from the survey area.

Transportation Facilities

The only major Federal highway that serves the survey area is Interstate 10, which runs north and south to the west of the survey area. Highways 60, 77, 79, and 177 run through the soil survey area, connecting the major towns of Florence, Oracle, San Manuel, Dudleyville, Mammoth, Winkelman, Hayden, Kearny, and Kelvin, Arizona. There are no commercial airlines that serve the survey area, but a small general aviation airport is located at Florence, Arizona.

How This Survey Was Made

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

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

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

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

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

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

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

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

This survey was mapped at two levels of detail. At the more detailed level, map units are narrowly defined. Map unit boundaries were plotted and verified at closely spaced intervals. At the less detailed level, map units are broadly defined. Boundaries were plotted and verified at wider intervals. The detailed map unit occurs within the San Pedro River corridor. The detail of mapping was selected to meet the anticipated long-term use of the survey, and the map units were designed to meet the need for that use.

The descriptions, name, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey area.

Detailed Soil Map Units and Classification of the Soils

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

Soil Map Unit Descriptions

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

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

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

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

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Gilman fine sandy loam, 0 to 2 percent slopes, is a phase of the Gilman series.

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

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Selevin-Tombstone-Buntline complex, 3 to 45 percent slopes, is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Cascabel, Wetrock soils, and Water, 0 to 5 percent slopes, is an undifferentiated group in this survey area.

This survey includes miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Riverwash and Rock outcrop are examples.

Classification of the Soils

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

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

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Argid (Arg, meaning 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; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplargids (Hapl, meaning minimal horizonation, plus argid, the suborder of the Aridisols that has an argillic horizon).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective Typic identifies the subgroup that typifies the

great group. The adjective Ustic identifies the subgroup having a soil moisture regime that borders on ustic. An example is Ustic Haplargids.

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

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

In the map unit descriptions, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series for a particular map unit. A pedon, a small three-dimensional area of soil, which is typical of the series within that map unit in the survey area, is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1999) and in "Keys to Soil Taxonomy" (USDA, 2006). Unless otherwise indicated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

Soil Descriptions

1—Agustin-Kokan-Queencreek complex, 1 to 8 percent slopes

Map Unit Setting

Landform(s): Agustin and Kokan – fan terraces; Queencreek – flood plains

Elevation: 1,760 to 2,690 feet (535 to 820 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Agustin and similar soils: 55 percent

Kokan and similar soils: 25 percent

Queencreek and similar soils: 15 percent

Minor components: Hayhook, Ugyp, Rillino, Riverwash

Soil Properties and Qualities

Agustin soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Slope: 1 to 8 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 75 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 85 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 5.4 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: medium

Hydrologic group: B

Ecological site name: Limy Fan 10–13" p.z.

Ecological site number: R040XA108AZ

Present vegetation: creosotebush, annual forbs, annual grasses, whitethorn acacia, saguaro, burroweed

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Winkleman; about 1,500 feet north and 2,200 feet west of the southeast corner of Section 16, Township 5 S, Range 15 E

Geographic Coordinate System:

32° 59' 44.80" north, 110° 49' 8.90" west

A—0 to 1 inch (0 to 3 cm); pinkish gray (7.5YR 6/2) gravelly sandy loam, dark brown (7.5YR 3/2), moist; 10 percent clay; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 30 percent gravel; noneffervescent; neutral, pH 7.2; abrupt smooth boundary.

Bw—1 inch to 15 inches (3 to 38 cm); brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 12 percent clay; moderate very fine and fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; 25 percent gravel; noneffervescent; slightly alkaline, pH 7.4; clear smooth boundary.

Bk1—15 to 28 inches (38 to 71 cm); brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 12 percent clay; moderate very fine and fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; common continuous distinct carbonate coats on faces of peds and rock fragments; 20 percent gravel; slightly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

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Bk2—28 to 60 inches (71 to 152 cm); brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; single grain; loose, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; many continuous distinct carbonate coats on rock fragments; 25 percent gravel; strongly effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Rock fragments: 15 to 30 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 7 to 18 percent

A horizon

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam

Bw and Bk horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: sandy loam, coarse sandy loam

Kokan soils

Taxonomic classification: Sandy-skeletal, mixed, thermic Typic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 50 percent

woody debris: 15 percent

bare soil: 15 percent

rock fragments

gravel: 50 percent

Drainage class: excessively drained

Ksat solum: 5.95 to 39.69 inches per hour (42.00 to 280.00 micrometers per second)

Available water capacity total inches: 1.9 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: A

Ecological site name: Limy Fan 10–13" p.z.

Ecological site number: R040XA108AZ

Present vegetation: creosotebush, annual forbs, annual grasses, whitethorn acacia, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; 1,500 feet north and 2,000 feet west of the southeast corner of Section 2, Township 5 S, Range 14 E

Geographic Coordinate System:

33° 1' 23.00" north, 110° 53' 5.00" west

C1—0 to 1 inch (0 to 3 cm); brown (10YR 4/3) loamy sand, dark yellowish brown (10YR 3/4), moist; 5 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine vesicular pores; slightly effervescent; neutral, pH 7.2; abrupt smooth boundary.

C2—1 inch to 9 inches (3 to 23 cm); dark yellowish brown (10YR 4/4) very gravelly loamy sand, dark yellowish brown (10YR 3/4), moist; 5 percent clay; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many fine tubular pores; few patchy distinct carbonate coats on rock fragments; 34 percent gravel and 2 percent cobble; slightly effervescent; neutral, pH 7.2; abrupt wavy boundary.

C3—9 to 32 inches (23 to 81 cm); dark yellowish brown (10YR 4/4) very gravelly loamy coarse sand, dark brown (10YR 3/3), moist; 5 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine irregular pores; many continuous distinct carbonate coats on top surfaces of rock fragments; 33 percent gravel and 5 percent cobble; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C4—32 to 60 inches (81 to 152 cm); brown (10YR 5/3) extremely gravelly coarse sand, brown (10YR 4/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; many very fine roots; many fine tubular pores; many patchy distinct carbonate coats on top surfaces of rock fragments; 46 percent gravel and 30 percent cobble; violently effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: 35 to 80 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 3 to 10 percent

C horizons

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: coarse sand, loamy sand, loamy coarse sand

Queencreek soils

Taxonomic classification: Sandy-skeletal, mixed, thermic Typic Torrifluvents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 1 to 3 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

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Physical cover
 canopy plant cover: 20 percent
 woody debris: 10 percent
 bare soil: 25 percent
rock fragments
 gravel: 65 percent
 cobble: 30 percent
 stone: 5 percent
Drainage class: excessively drained
Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)
Available water capacity total inches: 1.4 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: occasional
Runoff class: very low
Hydrologic group: A
Ecological site name: Sandy Wash 10–13" p.z.
Ecological site number: R040XA115AZ
Present vegetation: catclaw acacia, annual forbs, whitethorn, annual grasses, paloverde, perennial forbs, mesquite, burroweed, jumping cholla
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Winkleman; about 3,100 feet north and 700 feet west of the southeast corner of Section 17, Township 5 S, Range 15 E
Geographic Coordinate System:
 32° 59' 58.40" north, 110° 49' 45.00" west

C1—0 to 3 inches (0 to 8 cm); brown (10YR 5/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4), moist; 8 percent clay; weak thick platy parting to weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine irregular pores; 45 percent gravel; noneffervescent; slightly alkaline, pH 7.4; abrupt wavy boundary.

C2—3 to 36 inches (8 to 91 cm); brown (10YR 5/3) extremely gravelly coarse sand, dark yellowish brown (10YR 3/4), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many fine interstitial pores; 85 percent gravel; slightly effervescent; neutral, pH 7.2; abrupt smooth boundary.

C3—36 to 60 inches (91 to 152 cm); brown (10YR 5/3) extremely gravelly coarse sand, dark yellowish brown (10YR 3/4), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; few patchy distinct carbonate coats on rock fragments; 75 percent gravel; slightly effervescent; neutral, pH 7.2.

Range in Characteristics

Rock fragments: 35 to 85 percent
Reaction: 6.6 to 7.8 (neutral to slightly alkaline)
Average percent clay in the control section: 2 to 8 percent

C horizons

Hue: 7.5, 10YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: coarse sand, loamy sand, sandy loam

2—Ajo-Guvo-Rock outcrop complex, 15 to 60 percent slopes

Map Unit Setting

Landform(s): hills

Elevation: 1,700 to 2,200 feet (518 to 670 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Ajo and similar soils: 50 percent

Guvo and similar soils: 30 percent

Rock outcrop: 20 percent

Minor components: Guvo soils that contain more than 18 percent clay in the control section

Soil Properties and Qualities

Ajo soils

Taxonomic classification: Clayey, mixed, superactive, hyperthermic, shallow Argic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from basalt

Slope: 15 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 10 percent

 bare soil: 20 percent

rock fragments

 gravel: 75 percent

 cobble: 10 percent

 stone: 5 percent

Depth to restrictive feature(s): 5 to 15 inches to petrocalcic; 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)

0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)

Available water capacity total inches: 1.3 (very low)

Shrink-swell potential: about 7.5 LEP (high)

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Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Basalt Hills 7–10" p.z.

Ecological site number: R040XB201AZ

Present vegetation: annual forbs, creosotebush, saguaro, annual grasses, paloverde, ratany, brittlebush, triangle bursage, pricklypear and cholla

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 0 feet west and 1,000 feet north of southeast corner of Section 17, Township 5 S, Range 11 E

Geographic Coordinate System:

33° 4' 45.20" north, 111° 14' 59.50" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 4/4) gravelly sandy clay loam, dark reddish brown (5YR 3/3), moist; 32 percent clay; weak thin platy parting to moderate very fine subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; common very fine roots; many very fine tubular pores; 20 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt—1 inch to 9 inches (3 to 23 cm); reddish brown (5YR 4/4) clay, reddish brown (5YR 4/4), moist; 40 percent clay; strong fine subangular blocky structure; moderately hard, friable, very sticky and very plastic; common very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

Bkm—9 to 11 inches (23 to 28 cm); violently effervescent; cemented material, indurated; petrocalcic.

R—11 to 60 inches (28 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Rock fragments: 5 to 25 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 35 to 50 percent

A horizon

Hue: 5YR, 7.5YR

Value: 4 or 5 dry, 3 moist

Chroma: 3 or 4, dry or moist

Texture: loam, sandy clay loam

Bt horizon

Hue: 5YR

Value: 3 or 4, dry or moist

Chroma: 3 or 4, dry or moist

Texture: clay, clay loam

Bkm horizon

Cemented: calcium carbonate and silica

Hardness: indurated

Thickness: 5 to 15 inches; continuous

R horizon

Basalt bedrock

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Ajo series as used in this map unit is a taxadjunct to the series because the family classification is clayey and this soil has bedrock below the Petrocalcic at shallow depths. Ajo series is loamy-skeletal, mixed, superactive, hyperthermic Argic Petrocalcids.

Guvo soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Calcic Lithic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from basalt

Slope: 15 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 10 percent

 bare soil: 5 percent

rock fragments

 gravel: 75 percent

 cobble: 10 percent

Depth to restrictive feature(s): 5 to 15 inches to petrocalcic; 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)

0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)

Available water capacity total inches: 0.7 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Basalt Hills 7-10" p.z.

Ecological site number: R040XB201AZ

Present vegetation: creosotebush, annual forbs, annual grasses, paloverde, saguaro, brittlebush, ratany, triangle bursage, pricklypear and cholla

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 250 feet west and 2,000 feet north of the southeast corner of Section 18, Township 5 S, Range 11 E

Geographic Coordinate System:

33° 4' 49.20" north, 111° 15' 2.40" west

A—0 to 1 inch (0 to 3 cm); pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3), moist; 15 percent clay; strong medium platy parting to moderate fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; common

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very fine tubular and common fine vesicular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate nodules; 30 percent gravel and 5 percent cobble; violently effervescent, 20 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bk—1 inch to 8 inches (3 to 20 cm); pale brown (10YR 6/3) very gravelly loam, dark yellowish brown (10YR 4/4), moist; 18 percent clay; weak very fine subangular blocky structure; soft, very friable, slightly sticky and moderately plastic; many very fine and fine roots; many fine irregular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate nodules; 35 percent gravel and 5 percent cobble; violently effervescent, 36 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkm—8 to 10 inches (20 to 25 cm); violently effervescent; cemented material, indurated; petrocalcic.

R—10 to 60 inches (25 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Rock fragments: 25 to 50 percent, averages more than 35 percent

Reaction: 7.4 to 8.4 (slightly alkaline to moderately alkaline)

Average percent clay in the control section: 7 to 20 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: loam

Bk horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: loam

Bkm horizon

Cemented: calcium carbonate and silica

Hardness: indurated

Thickness: 5 to 15 inches; continuous

R horizon

Basalt bedrock

Guvo series as used in this map unit is a taxadjunct to the series because this soil contains basalt bedrock at shallow depths. Guvo series is loamy-skeletal, mixed, superactive, hyperthermic, shallow Calcic Petrocalcids.

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of basalt. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the summits.

3—Beardsley-Hickiwan complex, 1 to 8 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,650 to 2,000 feet (502 to 610 meters)

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Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40–Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Beardsley and similar soils: 70 percent

Hickiwan and similar soils: 20 percent

Minor components: Ebon, Pinamt, Carrizo, Momoli, Mohall

Soil Properties and Qualities

Beardsley soils

Taxonomic classification: Fine, mixed, superactive, hyperthermic Vertic Argidurids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 10 percent

 bare soil: 40 percent

rock fragments: 0 percent

Depth to restrictive feature(s): 20 to 40 inches to duripan

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 4.2 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: medium

Hydrologic group: C

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: creosotebush, triangle bursage, ironwood

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 1,900 feet south and 300 feet east of the northwest corner of Section 35, Township 2 S, Range 10 E

Geographic Coordinate System:

33° 12' 8.00" north, 111° 17' 50.00" west

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A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/4), moist; 31 percent clay; weak thin platy structure; soft, friable, moderately sticky and moderately plastic; common very fine roots; common fine irregular pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bt—3 to 11 inches (8 to 28 cm); brown (7.5YR 4/4) clay, brown (7.5YR 4/3), moist; 44 percent clay; strong fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; common fine tubular pores; common continuous prominent clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Btk—11 to 27 inches (28 to 69 cm); reddish brown (5YR 4/4) clay, reddish brown (5YR 4/3), moist; 54 percent clay; strong fine, medium, and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; common fine tubular pores; common continuous prominent clay films on faces of peds; few very fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

2Bkqm—27 to 60 inches (69 to 152 cm); cemented material, indurated; duripan.

Range in Characteristics

Rock fragments: 0 to 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 to 6, dry or moist

Texture: clay loam, loam

Calcium carbonate equivalent: 0 to 2 percent

B horizons

Hue: 7.5YR, 5YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 3 to 6, dry or moist

Texture: clay loam, clay

Calcium carbonate equivalent: 5 to 15 percent

2Bkqm horizon

Cemented: calcium carbonate and silica

Hardness: indurated

Thickness: 3 to 5 feet – continuous

Hickiwan soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic, shallow
Calcic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Physical cover
canopy plant cover: 40 percent
woody debris: 10 percent
bare soil: 50 percent
rock fragments: 0 percent
Depth to restrictive feature(s): 8 to 20 inches to petrocalcic
Drainage class: well drained
Ksat solum: 0.57 to 1.98 inches per hour (4.00 to 14.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 0.9 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: high
Hydrologic group: D
Ecological site name: Limy Upland 7–10" p.z.
Ecological site number: R040XB210AZ
Present vegetation: creosotebush, triangle bursage, ironwood
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 1,000 feet south and 700 feet east of the northwest corner of Section 35, Township 2 S, Range 10 E

Geographic Coordinate System:

33° 12' 9.00" north, 111° 17' 58.00" west

A—0 to 2 inches (0 to 5 cm); light brown (7.5YR 6/4) cobbly loam, brown (7.5YR 5/4), moist; 20 percent clay; weak thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; few fine interstitial pores; 30 percent cobble; strongly effervescent, 15 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Bk—2 to 9 inches (5 to 23 cm); light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4), moist; 20 percent clay; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; few fine tubular pores; common continuous distinct carbonate coats on faces of peds and rock fragments; 50 percent gravel; violently effervescent, 20 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bkm—9 to 60 inches (23 to 152 cm); cemented material, indurated; petrocalcic.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 15 to 25 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: loam, fine sandy loam

Calcium carbonate equivalent: 2 to 5 percent

B horizon

Hue: 10YR, 7.5YR
Value: 6 or 7 dry, 4 to 6 moist
Chroma: 2 to 4 dry, 2 to 5 moist
Texture: loam, fine sandy loam, sandy loam
Calcium carbonate equivalent: 15 to 30 percent

Bkm horizon

Cemented: calcium carbonate
Hardness: indurated
Thickness: 3 to 5 feet – continuous

4—Beardsley-Suncity complex, 1 to 10 percent slopes

Map Unit Setting

Landform(s): fan terraces
Elevation: 1,650 to 2,000 feet (502 to 610 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Beardsley and similar soils: 60 percent
Suncity and similar soils: 30 percent

Minor components: Tremant, Brios, Carrizo, Pinamt, Ebon, Beardsley soils that have hard pans above 20 inches or below 40 inches, Suncity soils that have hard pans below 20 inches.

Soil Properties and Qualities

Beardsley soils

Taxonomic classification: Fine, mixed, superactive, hyperthermic Vertic Argidurids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 5 percent

 bare soil: 35 percent

rock fragments

 gravel: 25 percent

 cobble: 3 percent

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Depth to restrictive feature(s): 20 to 40 inches to duripan
Drainage class: well drained
Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 4.2 (low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: medium
Hydrologic group: C
Ecological site name: Loamy Upland 7–10" p.z.
Ecological site number: R040XB213AZ
Present vegetation: mesquite, wolfberry, jumping cholla, paloverde, creosotebush, triangle bursage, graythorn, netleaf hackberry, annual grasses
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence Junction; about 600 feet south and 1,600 feet east of the northwest corner of Section 17, Township 2 S, Range 10 E

Geographic Coordinate System:

33° 15' 50.00" north, 111° 21' 4.00" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/4), moist; 31 percent clay; weak thin platy structure; soft, friable, moderately sticky and moderately plastic; common very fine roots; common fine irregular pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bt—3 to 11 inches (8 to 28 cm); brown (7.5YR 4/4) clay, brown (7.5YR 4/3), moist; 44 percent clay; strong fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; common fine tubular pores; many continuous prominent clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Btk—11 to 27 inches (28 to 69 cm); reddish brown (5YR 4/4) clay, reddish brown (5YR 4/3), moist; 54 percent clay; strong fine, medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; common fine tubular pores; many continuous prominent clay films on faces of peds; few very fine carbonate filaments; 3 percent gravel; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkqm—27 to 60 inches (69 to 152 cm); cemented material, very thin laminar cap; indurated duripan.

Range in Characteristics

Rock fragments: 0 to 20 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: loam, sandy clay loam, sandy loam, clay loam

Calcium carbonate equivalent: 0 to 2 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Bt and Btk horizons

Hue: 5YR, 7.5YR

Value: 4 or 5, dry or moist

Chroma: 4 to 6 dry, 3 to 6 moist

Texture: clay loam, clay, sandy clay, sandy clay loam

Calcium carbonate equivalent: 5 to 15 percent

Bkqm horizon

Cemented: calcium carbonate and silica

Hardness: indurated

Thickness: 5 to 10 feet – continuous

Suncity soils

Taxonomic classification: Loamy, mixed, superactive, hyperthermic, shallow Typic Argidurids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 35 percent

woody debris: 5 percent

bare soil: 40 percent

rock fragments

gravel: 20 percent

Depth to restrictive feature(s): 8 to 20 inches to duripan

Drainage class: well drained

Ksat solum: 0.57 to 1.98 inches per hour (4.00 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.6 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: high

Hydrologic group: D

Ecological site name: Granitic Upland 7–10" p.z.

Ecological site number: R040XB220AZ

Present vegetation: creosotebush, paloverde, jumping cholla, annual grasses, ironwood

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence Junction; about 550 feet south and 200 feet east of the northwest corner of Section 17, Township 2 S, Range 10 E

Geographic Coordinate System:

33° 15' 59.00" north, 111° 21' 33.00" west

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) loam, brown (7.5YR 4/4), moist; 21 percent clay; weak thin platy structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; many fine irregular pores; few patchy distinct organic stains on faces of peds; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—2 to 10 inches (5 to 25 cm); brown (7.5YR 5/4) loam, brown (7.5YR 4/4), moist; 26 percent clay; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; many continuous prominent clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkqm—10 to 60 inches (25 to 152 cm); cemented material, thin laminar cap; indurated duripan.

Range in Characteristics

Rock fragments: 0 to 20 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 20 to 27 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 4 moist

Chroma: 4, dry or moist

Texture: loam

Bt horizon

Hue: 5YR

Value: 4 or 5 dry, 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: clay loam, loam

Calcium carbonate equivalent: 0 to 5 percent

Bkqm horizon

Cemented: calcium carbonate and silica

Hardness: indurated

Thickness: 5 to 10 feet – continuous

5—Beaumont-Rock outcrop-Cherrycow complex, 5 to 60 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 4,160 to 5,180 feet (1,267 to 1,580 meters)

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

Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)

Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)

Frost-free period: 150 to 200 days

Major Land Resource Area: 38—Mogollon Transition

Land Resource Unit: 38-2 Interior Chaparral—Woodlands

Map Unit Composition

Beaumont and similar soils: 55 percent

Rock outcrop: 20 percent

Cherrycow and similar soils: 15 percent

Minor components: loamy soils that are moderately deep to bedrock.

Soil Properties and Qualities

Beaumont soils

Taxonomic classification: Clayey-skeletal, smectitic, thermic Aridic Lithic Argiustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from volcanic and metamorphic rock

Slope: 5 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 45 percent

 woody debris: 15 percent

 bare soil: 10 percent

rock fragments

 gravel: 55 percent

 cobble: 15 percent

 stone: 5 percent

 boulder: 0 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic

Drainage class: moderately well drained

Ksat solum: 0.00 to 1.98 inches per hour (0.01 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 0.9 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 16–20" p.z. Clayey

Ecological site number: R038XB215AZ

Present vegetation: turbinella oak, skunkbush sumac, cane beardgrass, mesa threeawn, canotia, singleleaf pinyon, sideoats grama, jojoba, Utah juniper, Mormon tea

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: Typical pedon description is from Soil Survey of San Carlos Indian Reservation, Arizona, parts of Gila and Graham counties; 1,560 feet north and 1,250 feet east of southwest corner of Section 23, Township 4 S, Range 18 E

Geographic Coordinate System:

33° 4' 3.94" north, 110° 28' 46.76" west

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

A—0 to 3 inches (0 to 8 cm); brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2), moist; 22 percent clay; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 50 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.6; clear wavy boundary.

Bt—3 to 9 inches (8 to 23 cm); brown (7.5YR 4/3) very gravelly clay loam, dark brown (7.5YR 3/2), moist; 38 percent clay; moderate medium and coarse subangular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine roots; many very fine and fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 50 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.6; clear wavy boundary.

R—9 to 60 inches (23 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Organic matter: 1 to 3 percent

Reaction: neutral to slightly alkaline (6.6 to 7.8)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR, 10YR

Value: 3 or 4 dry, 2 to 3 moist

Chroma: 2 or 3 dry or moist

Texture: loam, clay loam

Bt horizon

Hue: 5YR, 7.5YR

Value: 3 or 4 dry or moist

Chroma: 2 or 3 dry or moist

Texture: clay loam, clay

R horizon

Basalt, andesite, and volcanic bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of volcanic bedrock. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Cherrycow soils

Taxonomic classification: Fine, smectitic, thermic Aridic Argiustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from volcanic and metamorphic rock

Slope: 5 to 35 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Physical cover
 canopy plant cover: 60 percent
 woody debris: 5 percent
 bare soil: 5 percent
rock fragments
 gravel: 20 percent
 cobble: 10 percent
 stone: 0 percent
Depth to restrictive feature(s): 20 to 40 inches to bedrock, lithic
Drainage class: well drained
Ksat solum: 0.00 to 0.57 inches per hour (0.01 to 4.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)
Available water capacity total inches: 3.4 (low)
Shrink-swell potential: about 10.0 LEP (very high)
Flooding hazard: none
Runoff class: very high
Hydrologic group: D
Ecological site name: Clay Loam Upland 16–20" p.z.
Ecological site number: R038XB203AZ
Present vegetation: mesquite, catclaw acacia, pinyon, snakeweed, turbinella oak, oneseed juniper, curlymesquite, yerba de pasmo
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: Typical pedon description is from Soil Survey of San Carlos Indian Reservation, Arizona, Parts of Gila and Graham counties; about 2,600 feet west and 650 feet south of the northeast corner of Section 23, Township 4 S, Range 18 E

Geographic Coordinate System:

33° 4' 30.28" north, 110° 28' 25.63" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/2) gravelly clay loam, dark brown (7.5YR 3/2), moist; 35 percent clay; moderate fine granular structure; slightly hard, very friable, very sticky and very plastic; many very fine and many fine roots; many very fine and fine tubular and common medium tubular pores; 20 percent gravel and 10 percent cobble; neutral, pH 7.2; gradual wavy boundary.

Bt1—2 to 10 inches (5 to 25 cm); brown (7.5YR 4/3) cobbly clay, dark brown (7.5YR 3/3), moist; 58 percent clay; strong fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine and fine roots; many very fine and fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel and 10 percent cobble; neutral, pH 7.2; gradual wavy boundary.

Bt2—10 to 30 inches (25 to 76 cm); brown (7.5YR 4/3) gravelly clay, dark brown (7.5YR 3/3), moist; 58 percent clay; strong medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine and fine roots; common very fine and fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel and 5 percent cobble; neutral, pH 7.2; abrupt wavy boundary.

R—30 to 60 inches (76 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Rock fragments: 15 to 30 percent
Organic matter: 1 to 3 percent
Reaction: neutral to slightly alkaline (6.6 to 7.8)
Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 5YR, 7.5YR
Value: 3 to 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: clay loam, clay

Bt horizons

Hue: 5YR, 7.5YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: clay

R horizon

Basalt, andesite, and volcanic bedrock

6—Bodecker soils and Riverwash, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 3,000 to 3,600 feet (914 to 1,097 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Stream Segment Properties and Qualities

Active flood plain width: 20 to 2,000 feet

Stream flow: intermittent stream; flows seasonally with rainfall events

Flooding hazard: frequent, very brief, 4 to 48 hours

Flooding month: July–September

Bank entrenchment –

percent cut: 90

percent uncut: 10

vertical cut: 5 to 50 feet; averages 3 to 15 feet

Depositional bar features: dynamic system of interbraided bars and channels that relocate with each major flood event

Meander pattern: irregular meander

Channel composition:

percent bedrock: 2

percent cobbles: 18

percent gravel: 40

percent sand: 20

percent silt and clay: 20

Stability: a dynamic system of interbraided components that aggrade and degrade seasonally

Map Unit Composition

This is an undifferentiated map unit. These components are not consistently associated geographically. At least one component is present in every delineation, but each delineation can have any combination of the components. This map unit is not consistent over time. The components of this map unit consist of a dynamic interbraided system of bars and channels. The active stream dynamics will cause these components to shift locations. During severe rainfall events, the channel will cut and fill throughout its length.

Minor components: Combate, soils that have less than 35 percent rock fragments, water

Soil Properties and Qualities

Bodecker soils

Taxonomic classification: Sandy-skeletal, mixed, thermic Ustic Torriorthents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 80 percent

 woody debris: 5 percent

 bare soil: 0 percent

rock fragments

 gravel: 75 percent

Drainage class: excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 2.4 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: occasional

Runoff class: negligible

Hydrologic group: A

Ecological site name: Sandy Wash 12–16" p.z.

Ecological site number: R041XC316AZ

Present vegetation: Arizona cottontop, bush muhly, catclaw acacia, mesquite, plains
 bristlegrass, sideoats grama, desert hackberry, pricklypear and cholla, spike
 dropseed, threeawn, yucca, giant sacaton

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle north of Oracle; about 2,000 feet west and 2,300 feet north of the southeast corner of Section 20, Township 8 S, Range 15 E

Geographic Coordinate System:

32° 43' 10.00" north, 110° 49' 50.00" west

A—0 to 2 inches (0 to 5 cm); yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3), moist; 13 percent clay; weak thin and medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine interstitial pores; 45 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C1—2 to 14 inches (5 to 36 cm); yellowish brown (10YR 5/4) very gravelly sand, brown (10YR 4/3), moist; 8 percent clay; single grain; loose, nonsticky and nonplastic; many very fine roots; common fine interstitial pores; 45 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C2—14 to 21 inches (36 to 53 cm); yellowish brown (10YR 5/4) sand, brown (10YR 4/3), moist; 8 percent clay; single grain; loose, nonsticky and nonplastic; common fine and few medium roots; common fine interstitial pores; 10 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C3—21 to 35 inches (53 to 89 cm); yellowish brown (10YR 5/4) very gravelly sand, brown (10YR 4/3), moist; 8 percent clay; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and coarse roots; common fine interstitial pores; 40 percent gravel; noneffervescent; slightly alkaline, pH 7.6; clear smooth boundary.

C4—35 to 60 inches (89 to 152 cm); brown (10YR 4/3) extremely gravelly loamy sand, dark brown (10YR 3/3), moist; 13 percent clay; massive; slightly hard, very friable, nonsticky and nonplastic; few coarse roots; common fine interstitial pores; 65 percent gravel; slightly effervescent; slightly alkaline, pH 7.6.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 2 to 10 percent

A and/or C horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 2 to 4 dry, 3 or 4 moist

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

Riverwash

Width: 2 to 400 feet

Depth of water when present: 0 to 36 inches

Riverwash consists of very deep, excessively drained, stratified sands, gravels, and cobbles from numerous sources. This material is part of a dynamic interbraided system of bars and channels, commonly bordered by shallow to steep vertical banks cut into the alluvium. It is not stable and is subject to shifting and sorting. It is usually dry but can be transformed into a temporary watercourse or a short-lived torrent after a heavy rain within the watershed. In very wet years, surface water is present for part of the year, replacing Riverwash with water. This material does not support vegetation because of the constant scouring and shifting it undergoes.

7—Brewster-Rock outcrop-Woodcutter complex, 10 to 60 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 4,500 to 6,550 feet (1,368 to 1,997 meters)

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

Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)

Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)

Frost-free period: 150 to 200 days

Major Land Resource Area: 38—Mogollon Transition

Land Resource Unit: 38–2 Interior Chaparral–Woodlands

Map Unit Composition

Brewster and similar soils: 40 percent

Rock outcrop: 30 percent

Woodcutter and similar soils: 20 percent

Minor components: Terrarossa, soils that are moderately deep to bedrock

Soil Properties and Qualities

Brewster soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Aridic Lithic Haplustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from quartzite

Slope: 10 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 20 percent

 woody debris: 5 percent

 bare soil: 20 percent

rock fragments

 gravel: 30 percent

 cobble: 45 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.57 to 1.98 inches per hour (4.00 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.2 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site name: Volcanic Hills 12–16" p.z. Clayey

Ecological site number: R038XA117AZ

Present vegetation: sideoats grama, hairy grama, turbinella oak, Texas bluestem, plains lovegrass, purple threeawn, slender grama, perennial forbs, agave, Emory oak, manzanita, bullgrass, juniper, green sprangletop, sotol, spidergrass, wolftail

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle El Capitan; about 1,000 feet south and 1,900 feet east of the northwest corner of Section 30, Township 2 S, Range 15 E

Geographic Coordinate System:

33° 14' 7.80" north, 110° 51' 17.40" west

A1—0 to 3 inches (0 to 8 cm); brown (7.5YR 4/3) very gravelly loam, dark brown (7.5YR 3/3), moist; 19 percent clay; single grain; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine interstitial pores; 35 percent gravel and 10 percent cobble; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

A2—3 to 13 inches (8 to 33 cm); brown (7.5YR 4/3) very gravelly loam, dark brown (7.5YR 3/3), moist; 25 percent clay; weak very fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine tubular pores; 35 percent gravel and 15 percent cobble; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

R—13 to 60 inches (33 to 152 cm); unweathered quartzite bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Organic matter: 1 to 3 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 20 to 35 percent

A horizons

Hue: 7.5YR, 10YR

Value: 3 or 4 dry or moist

Chroma: 2 or 3 dry or moist

Texture: clay loam, loam

R horizon

Quartzite bedrock

Rock outcrop

Rock outcrop consists of barren rock that occur as ledges and nearly vertical cliffs of quartzite bedrock. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Woodcutter soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Aridic Lithic Argiustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from quartzite

Slope: 10 to 60 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 10 percent

bare soil: 20 percent

rock fragments

gravel: 20 percent

cobble: 45 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.20 to 1.98 inches per hour (1.40 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.3 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 12–16" p.z. Clayey

Ecological site number: R038XA117AZ

Present vegetation: sideoats grama, hairy grama, turbinella oak, Texas bluestem, plains lovegrass, purple threeawn, slender grama, perennial forbs, agave, Emory oak, manzanita, bullgrass, juniper, green sprangletop, sotol, spidergrass, wolftail

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle El Capitan; about 500 feet south and 1,700 feet east of the northwest corner of Section 30, Township 2 S, Range 15 E

Geographic Coordinate System:

33° 14' 7.50" north, 110° 51' 22.30" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 4/3) very cobbly loam, dark brown (7.5YR 3/3), moist; 19 percent clay; single grain; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; 10 percent gravel and 40 percent cobble; noneffervescent; slightly acid, pH 6.2; abrupt wavy boundary.

Bt—3 to 13 inches (8 to 33 cm); reddish brown (5YR 4/3) very gravelly clay loam, dark reddish brown (5YR 3/3), moist; 32 percent clay; strong fine and medium subangular blocky structure; soft, very friable, moderately sticky and very plastic; many very fine and common fine roots; common very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 30 percent gravel and 10 percent cobble; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

R—13 to 60 inches (33 to 152 cm); unweathered quartzite bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent
Organic matter: 1 to 3 percent
Reaction: 6.1 to 7.3 (slightly acid to neutral)
Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR, 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam, loam

Bt horizon

Hue: 7.5YR, 5YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 2 through 4 dry or moist
Texture: clay loam, loam

R horizon

Quartzite bedrock

8—Brunkcow-Chiricahua complex, 10 to 60 percent slopes

Map Unit Setting

Landform(s): hills
Elevation: 2,990 to 3,890 feet (912 to 1,186 meters)
Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)
Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)
Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)
Frost-free period: 180 to 230 days
Major Land Resource Area: 41—Southeastern Arizona Basin and Range
Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Brunkcow and similar soils: 50 percent
Chiricahua and similar soils: 25 percent
Minor components: Deloro, Riverwash, soils that are clayey-skeletal and very deep

Soil Properties and Qualities

Brunkcow soils

Taxonomic classification: Loamy, mixed, superactive, thermic, shallow Ustic Haplocambids
Geomorphic position: generally on summits and backslopes
Parent material: slope alluvium and/or residuum weathered from granite
Slope: 10 to 60 percent
Surface cover:
Biological crust
cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 40 percent
woody debris: 20 percent
bare soil: 15 percent
rock fragments
gravel: 75 percent
cobble: 5 percent
Depth to restrictive feature(s): 5 to 20 inches to bedrock, paralithic; 20 to 40 inches to bedrock, lithic
Drainage class: well drained
Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 1.5 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very high
Hydrologic group: C
Ecological site name: Loamy Upland 12–16" p.z.
Ecological site number: R041XC313AZ
Present vegetation: banana yucca, purple threeawn, pricklypear and cholla, annual forbs, curly mesquite, bush muhly, spidergrass, black grama, perennial forbs, whitethorn acacia, hedgehog cactus, green sprangletop, shrubby buckwheat, whitestem paperflower
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Crozier Peak; about 250 feet north and 1,100 feet east of the southwest corner of Section 32, Township 5 S, Range 14 E

Geographic Coordinate System:

32° 56' 44.10" north, 110° 56' 29.90" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/3) gravelly sandy loam, dark brown (7.5YR 3/2), moist; 10 percent clay; moderate thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine tubular pores; 15 percent gravel; noneffervescent; neutral, pH 7.0; abrupt smooth boundary.

Bw—2 to 13 inches (5 to 33 cm); brown (7.5YR 4/3) gravelly loam, dark brown (7.5YR 3/3), moist; 26 percent clay; moderate fine and medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine and fine and common medium roots; many very fine tubular pores; 20 percent gravel; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

Crk—13 to 27 inches (33 to 69 cm); few continuous distinct carbonate coats on bedrock; weathered granite bedrock; abrupt wavy boundary.

R—27 to 60 inches (69 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Rock fragments: 10 to 35 percent
Reaction: 6.6 to 7.3 (neutral)
Average percent clay in the control section: 18 to 35 percent

A horizon

Hue: 7.5YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 3 or 4 dry, 2 to 4 moist
Texture: loam, sandy loam

Bw horizon

Hue: 7.5YR
Value: 4 to 6 dry, 3 or 4 moist
Chroma: 3 to 6 dry, 3 or 4 moist
Texture: sandy loam, loam, clay loam

Crk and R horizons

Granite bedrock

Brunkcow as used in this mapping unit is a taxadjunct to the series because this soil has a cambic horizon. Brunkcow series is Loamy, mixed, superactive, thermic, shallow Ustic Haplargids.

Chiricahua soils

Taxonomic classification: Fine, mixed, superactive, thermic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 10 to 60 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent

Chemical crust

salt: 0 percent
gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent
woody debris: 20 percent
bare soil: 15 percent

rock fragments

gravel: 50 percent
cobble: 25 percent
stone: 5 percent

Depth to restrictive feature(s): 20 to 40 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 3.2 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Granitic Upland 12–16" p.z.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site number: R041XC322AZ

Present vegetation: mesquite, turpentine bush, purple threeawn, banana yucca, pricklypear and cholla, annual forbs, sideoats grama, Rothrock's grama, black grama, perennial forbs, whitethorn acacia, hedgehog cactus, whitestem paperflower

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Crozier Peak; about 200 feet north and 2,000 feet west of the southeast corner of Section 23, Township 5 S, Range 14 E

Geographic Coordinate System:

32° 56' 44.80" north, 110° 56' 3.80" west

A—0 to 0.5 inch (0 to 1 cm); strong brown (7.5YR 4/6) gravelly sandy loam, reddish brown (5YR 4/4), moist; 19 percent clay; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many fine interstitial pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt smooth boundary.

Bt—0.5 inch to 16 inches (1 to 41 cm); reddish brown (2.5YR 4/4) gravelly clay, dark red (2.5YR 3/6), moist; 50 percent clay; strong fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; many very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 20 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

BCt—16 to 28 inches (41 to 71 cm); strong brown (7.5YR 5/6) gravelly sandy clay, strong brown (7.5YR 4/6), moist; 42 percent clay; moderate fine subangular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine roots; many fine interstitial and tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 25 percent gravel; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

Crk—28 to 60 inches (71 to 152 cm); many continuous distinct clay films along fractures; many continuous distinct carbonate coats on bedrock; weathered granite bedrock.

Range in Characteristics

Rock fragments: 10 to 35 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 6 dry, 3 or 4 moist

Texture: sandy loam, sandy clay loam

Bt horizon

Hue: 7.5YR, 5YR, 2.5YR

Value: 4 or 5 dry, 3 to 5 moist

Chroma: 3 to 6 dry or moist

Texture: clay loam, clay

BCt horizon

Hue: 7.5 YR

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Value: 5 or 6 dry, 4 moist
Chroma: 4 to 6 dry or moist
Texture: sandy loam, sandy clay loam, sandy clay

Crtk horizon

Granite bedrock

Chiricahua as used in this mapping unit is a taxadjunct to the series because the depth to weathered bedrock is greater than 20 inches. Chiricahua series is Clayey, mixed, superactive, thermic, shallow Ustic Haplargids.

9—Bucklebar-Hayhook complex, 1 to 10 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,090 to 2,990 feet (638 to 912 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Bucklebar and similar soils: 45 percent

Hayhook and similar soils: 35 percent

Minor components: Rillino, Queencreek, Delthorny, Riverwash, Nahda, Agustin,
Tubac, Rillino

Soil Properties and Qualities

Bucklebar soils

Taxonomic classification: Fine-loamy, mixed, superactive, thermic Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 40 percent

rock fragments

 gravel: 5 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 10.4 (very high)

Shrink-swell potential: about 4.5 LEP (moderate)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Flooding hazard: none

Runoff class: medium

Hydrologic group: B

Ecological site name: Loamy Upland 10–13" p.z.

Ecological site number: R040XA114AZ

Present vegetation: annual grasses, triangle bursage, annual forbs, pricklypear and cholla, paloverde, saguaro, buckhorn cholla, catclaw acacia, ocotillo, range ratany

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Durham Hills; about 600 feet north and 1,600 feet east of the southwest corner of Section 7, Township 9 S, Range 12 E

Geographic Coordinate System:

32° 39' 29.00" north, 111° 9' 7.00" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; weak thin platy parting to weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine irregular pores; 5 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt1—3 to 9 inches (8 to 23 cm); reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4), moist; 22 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common very fine and few medium roots; common very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt2—9 to 28 inches (23 to 71 cm); reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4), moist; 31 percent clay; strong fine and medium angular and subangular blocky structure; hard, firm, very sticky and very plastic; few very fine and few medium roots; common very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt3—28 to 60 inches (71 to 152 cm); reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4), moist; 25 percent clay; strong fine and medium angular and subangular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.6.

Range in Characteristics

Rock fragments: 0 to 15 percent gravel

Reaction: 6.6 to 8.4 (neutral to moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 3 or 4 moist

Chroma: 4 dry, 3 or 4 moist

Texture: sandy loam, loamy sand

Bt horizons

Hue: 7.5YR, 5YR

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Value: 4 or 5 dry, 3 or 4 moist
Chroma: 4 to 6 dry, 3 or 4 moist
Texture: sandy loam, sandy clay loam, clay loam

Hayhook soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Typic Haplocambids

Geomorphic position: generally on summits, backslopes, or toeslopes

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 40 percent

rock fragments

 gravel: 15 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 6.6 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: B

Ecological site name: Sandy Loam Upland 10–13" p.z. Deep

Ecological site number: R040XA117AZ

Present vegetation: annual forbs, annual grasses, saguaro, triangle bursage, paloverde, ironwood, catclaw acacia, creosotebush, buckhorn cholla, wolfberry

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Durham Hills; about 1,000 feet east and 1,150 feet north of the southwest corner of Section 7, Township 9 S, Range 12 E

Geographic Coordinate System:

32° 39' 35.00" north, 111° 9' 14.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 10 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 5 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bw1—2 to 12 inches (5 to 30 cm); strong brown (7.5YR 5/6) sandy loam, brown (7.5YR 4/4), moist; 14 percent clay; moderate very fine and fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; many very fine and few

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coarse roots; many very fine irregular pores; 5 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

Bw₂—12 to 25 inches (30 to 64 cm); strong brown (7.5YR 5/6) sandy loam, brown (7.5YR 4/4), moist; 12 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine irregular pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bk—25 to 60 inches (64 to 152 cm); light brown (7.5YR 6/4) sandy loam, brown (7.5YR 4/4), moist; 13 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; common patchy distinct carbonate coats on rock fragments; 10 percent gravel; strongly effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Rock fragments: 0 to 10 percent

Reaction: 6.6 to 8.4 (neutral to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 3 or 4 moist

Chroma: 4 dry, 3 or 4 moist

Texture: sandy loam

Bw horizons

Hue: 7.5YR

Value: 5 dry, 3 or 4 moist

Chroma: 6 dry, 3 or 4 moist

Texture: sandy loam

Bk horizons

Hue: 7.5YR

Value: 5 or 6 dry, 4 moist

Chroma: 4 dry or moist

Texture: sandy loam, loamy sand

Calcium carbonate equivalent: 1 to 4 percent

10—Caracara-Delthorny complex, 3 to 45 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,980 to 3,980 feet (909 to 1,212 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—1 Upper Sonoran Desert Shrub

Map Unit Composition

Caracara and similar soils: 65 percent

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Delthorny and similar soils: 25 percent

Minor components: Queencreek, Riverwash, Stagecoach, Ripsey

Soil Properties and Qualities

Caracara soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic, shallow Argic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 3 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 0 percent

 bare soil: 5 percent

rock fragments

 gravel: 55 percent

 cobble: 20 percent

 stone: 10 percent

Depth to restrictive feature(s): 6 to 15 inches to petrocalcic; 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

Available water capacity total inches: 0.9 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Slopes 10–13" p.z.

Ecological site number: R040XA110AZ

Present vegetation: pricklypear and cholla, brittlebush, whitethorn acacia, curly mesquite, blue threeawn, jumping cholla, paloverde, ocotillo, saguaro, buckhorn cholla, slender janusia, mormon tea, fishhook barrel cactus

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Clark Ranch; about 1,600 feet south and 2,200 feet east of the northwest corner of Section 18, Township 8 S, Range 18 E

Geographic Coordinate System:

32° 44' 24.20" north, 110° 32' 42.30" west

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 4/4) extremely cobbly clay loam, dark brown (7.5YR 3/3), moist; 32 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; few very fine interstitial pores; 30 percent gravel and 35 percent cobble; noneffervescent; slightly acid, pH 6.4; clear smooth boundary.

Bt1—1 inch to 8 inches (3 to 20 cm); reddish brown (5YR 4/3) very gravelly clay, dark reddish brown (5YR 3/3), moist; 50 percent clay; strong very fine and fine subangular blocky structure; slightly hard, friable, very sticky and very plastic; many very fine and fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 45 percent gravel and 10 percent cobble; noneffervescent; slightly acid, pH 6.2; abrupt wavy boundary.

Bt2—8 to 14 inches (20 to 36 cm); reddish brown (5YR 4/4) extremely gravelly clay, dark reddish brown (5YR 3/4), moist; 50 percent clay; strong very fine and fine subangular blocky structure; slightly hard, friable, very sticky and very plastic; common very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 55 percent gravel and 10 percent cobble; noneffervescent; neutral, pH 7.2; abrupt wavy boundary.

Bkm—14 to 15 inches (36 to 38 cm); violently effervescent; cemented material, indurated petrocalcic.

R—15 to 60 inches (38 to 152 cm); unweathered conglomerate bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 5 dry or moist

Texture: sandy loam, clay loam, sandy clay loam

Bt horizons

Hue: 5YR, 2.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: clay, sandy clay, clay loam

Calcium carbonate equivalent: 0 to 10 percent

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 to 10 inches; continuous

R horizon

Conglomerate bedrock

Caracara as used in this mapping unit is a taxadjunct to the series because it is shallow and not moderately deep to hardpan. Caracara series is Clayey-skeletal, mixed, superactive, thermic Argic Petrocalcids.

Delthorny soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Calcic Lithic Petrocalcids

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 3 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 0 percent

 bare soil: 5 percent

rock fragments

 gravel: 50 percent

 cobble: 30 percent

 stone: 10 percent

Depth to restrictive feature(s): 6 to 15 inches to petrocalcic; 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

Available water capacity total inches: 0.8 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Slopes 10–13" p.z.

Ecological site number: R040XA110AZ

Present vegetation: pricklypear and cholla, brittlebush, whitethorn acacia, curly mesquite, blue threeawn, jumping cholla, creosotebush, paloverde, ocotillo, saguaro, buckhorn cholla, slender janusia, mormon tea, fishhook barrel cactus

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Clark Ranch; about 1,400 feet south and 1,800 feet east of the northwest corner of Section 18, Township 8 S, Range 18 E

Geographic Coordinate System:

32° 44' 26.10" north, 110° 32' 46.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/3) very gravelly sandy loam, brown (7.5YR 4/3), moist; 12 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; 45 percent gravel; strongly effervescent, 5 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk—1 inch to 11 inches (3 to 28 cm); brown (7.5YR 4/4) very cobbly sandy loam,

brown (7.5YR 4/4), moist; 12 percent clay; moderate very fine and fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; many continuous distinct carbonate coats on faces of peds and rock fragments; 20 percent gravel and 30 percent cobble; violently effervescent, 10 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkm—11 to 18 inches (28 to 46 cm); cemented material, indurated petrocalcic.

R—18 to 60 inches (46 to 152 cm); unweathered conglomerate bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 7 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam

Bk horizon

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam, loam

Calcium carbonate equivalent: 5 to 20 percent

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 to 12 inches; continuous

R horizon

Conglomerate bedrock

11—Carrizo family-Brios-Riverwash complex, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,500 to 2,000 feet (456 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Stream Segment Properties and Qualities

Active flood plain width: 4 to 100 feet

Stream flow: intermittent stream; usually dry but can flow seasonally with significant rainfall events

Flooding hazard: frequent, very brief

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Flooding month: July–September

Bank entrenchment –

percent cut: 75

percent uncut: 25

vertical cut: 1 foot to 20 feet; averages 1 foot to 5 feet

Depositional bar features: dynamic system of interbraided bars and channels that relocate with each major flood event

Channel composition:

percent bedrock: 2

percent cobbles: 18

percent gavel: 40

percent sand: 20

percent silt and clay: 20

Stability: a dynamic system of interbraided components that aggrade and degrade seasonally

Map Unit Composition

Carrizo family and similar soils: 45 percent

Brios and similar soils: 30 percent

Riverwash: 15 percent

Minor components: Antho, Mariposa, Dateland, Denure, Gilman, Vint, Central Arizona Project Canal

Soil Properties and Qualities

Carrizo family soils

Taxonomic classification: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 5 percent

bare soil: 20 percent

rock fragments

gravel: 30 percent

cobble: 10 percent

Drainage class: excessively drained

Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)

Available water capacity total inches: 1.9 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: occasional

Runoff class: very low

Hydrologic group: A

Ecological site name: Sandy Wash 7–10" p.z.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site number: R040XB216AZ

Present vegetation: burrobush, catclaw acacia, paloverde, desert willow, desert broom baccharis, netleaf hackberry, creosotebush, canyon ragweed, annual grasses

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Superstition Mountains; about 2,100 feet south and 2,400 feet east of the northwest corner of Section 9, Township 2 S, Range 9 E

Geographic Coordinate System:

33° 16' 36.00" north, 111° 24' 55.00" west

C1—0 to 3 inches (0 to 8 cm); yellowish brown (10YR 5/4) fine sandy loam, dark yellowish brown (10YR 4/4), moist; 7 percent clay; weak medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few fine irregular pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C2—3 to 41 inches (8 to 104 cm); brown (7.5YR 5/3) very gravelly coarse sand, brown (7.5YR 5/2), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and medium roots; few fine irregular pores; 40 percent gravel and 15 percent cobble; noneffervescent; slightly alkaline, pH 7.8; clear smooth boundary.

C3—41 to 60 inches (104 to 152 cm); brown (7.5YR 5/3) extremely cobbly coarse sand, brown (7.5YR 5/2), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 40 percent gravel and 15 percent cobble and 10 percent stone; slightly effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 0 to 3 percent

C1 horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 to 6 dry, 3 or 4 moist

Texture: sand, sandy loam, fine sandy loam

C horizons

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 to 6 dry, 2 to 4 moist

Texture: coarse sand, sand, loamy sand

Rock fragments: 35 to 70 percent

Brios soils

Taxonomic classification: Sandy, mixed, hyperthermic Typic Torrifuvents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

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lichen: 0 percent
moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 40 percent
woody debris: 5 percent
bare soil: 45 percent
rock fragments
gravel: 10 percent
Drainage class: excessively drained
Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)
Available water capacity total inches: 3.8 (low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: occasional
Runoff class: very low
Hydrologic group: A
Ecological site name: Sandy Wash 7–10" p.z.
Ecological site number: R040XB216AZ
Present vegetation: burrobush, catclaw acacia, paloverde, desert willow, mesquite, desert broom baccharis, netleaf hackberry, ironwood, annual grasses, triangle bursage
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Superstition Mountains; about 1,800 feet south and 2,300 feet east of the northwest corner of Section 9, Township 2 S, Range 9 E

Geographic Coordinate System:

33° 16' 35.00" north, 111° 24' 58.00" west

C1—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) fine sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; single grain; loose, nonsticky and nonplastic; many very fine roots; few fine irregular pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C2—2 to 8 inches (5 to 20 cm); brown (7.5YR 5/4) very fine sandy loam, brown (7.5YR 4/4), moist; 12 percent clay; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; few fine tubular pores; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C3—8 to 25 inches (20 to 64 cm); light brown (7.5YR 6/3) sand, brown (7.5YR 5/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; many very fine roots; few fine irregular pores; 10 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C4—25 to 39 inches (64 to 99 cm); light brown (7.5YR 6/3) very gravelly coarse sand, brown (7.5YR 5/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and few medium and coarse roots; few fine irregular pores; 40 percent gravel; slightly effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C5—39 to 60 inches (99 to 152 cm); light brown (7.5YR 6/3) gravelly coarse sand, brown (7.5YR 5/3), moist; 2 percent clay; single grain; loose, nonsticky and

nonplastic; few very fine roots; few fine irregular pores; 25 percent gravel; slightly effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 1 to 5 percent
Calcium carbonate equivalent: 0 to 3 percent

C1 and C2 horizons

Hue: 7.5YR, 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4, dry or moist
Texture: very fine sandy loam, fine sandy loam, sandy loam, loamy sand
Rock fragments: 0 to 20 percent

C horizons

Hue: 7.5YR, 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4, dry or moist
Texture: coarse sand, sand, loamy sand, with stratification of finer or coarser material
Rock fragments: 0 to 40 percent

Riverwash

Width: 1 foot to 250 feet
Depth of water when present: 0 to 24 inches

Riverwash consists of very deep, excessively drained, stratified sands, gravel, and cobbles from numerous sources. This material is located in a dynamic interbraided system of bars and channels, commonly bordered by shallow to steep vertical banks cut into the alluvium. This material is not stable and is subject to shifting and sorting. It is usually dry but can be transformed into a temporary watercourse or a short-lived torrent after a heavy rain within the watershed. In very wet years surface water is present for short periods of time. Riverwash is replaced with water. This material does not support vegetation because of the constant scouring and shifting it undergoes.

12—Casa Grande fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

Landform(s): basin floors
Elevation: 1,130 to 1,990 feet (345 to 608 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Casa Grande and similar soils: 85 percent

Minor components: Denure, Dateland, Casa Grande clay loam surface textures, Riverwash

Soil Properties and Qualities

Casa Grande soils

Taxonomic classification: Fine-loamy, mixed, superactive, hyperthermic Typic Natrargids

Geomorphic position: drainageways

Parent material: mixed alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 10 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 10 percent

 woody debris: 10 percent

 bare soil: 80 percent

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 6.5 (moderate)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: rare

Runoff class: low

Hydrologic group: C

Ecological site name: Loamy Upland 7–10" p.z. Saline

Ecological site number: R040XB225AZ

Present vegetation: desert saltbush, thinleaf fourwing saltbush, Anderson wolfberry, Torrey wolfberry, mesquite, pricklypear and cholla

Land capability (non irrigated): 7s

Typical Profile

Location

Public Land Survey: Typical pedon description is from Soil Survey of Pinal County Arizona, Western Part; about 1,800 feet south and 490 feet east of center of Section 11, Township 6 S, Range 6 E

Geographic Coordinate System:

32° 54' 40.58" north, 111° 41' 41.70" west

Ap—0 to 13 inches (0 to 33 cm); light brown (7.5YR 6/4) fine sandy loam, reddish brown (5YR 4/4), moist; 13 percent clay; massive; hard, friable, slightly sticky and slightly plastic; common fine roots; many fine tubular pores; strongly effervescent, 10 percent calcium carbonate equivalent; moderately alkaline, pH 8.4; abrupt wavy boundary.

Btknz1—13 to 23 inches (33 to 58 cm); reddish brown (5YR 5/4) sandy clay loam, yellowish red (5YR 4/6), moist; 30 percent clay; moderate medium prismatic parting to moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine roots; many fine tubular pores; common continuous distinct clay films on faces of peds; common fine carbonate masses and salt crystals; strongly effervescent, 10 percent calcium carbonate equivalent; strongly alkaline, pH 8.6; clear wavy boundary.

Btknz2—23 to 28 inches (58 to 71 cm); reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4), moist; 30 percent clay; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine roots; many fine tubular pores; common continuous distinct clay films on faces of peds; common fine carbonate masses and few fine salt crystals; strongly effervescent, 17 percent calcium carbonate equivalent; strongly alkaline, pH 8.8; clear wavy boundary.

Btknz3—28 to 49 inches (71 to 124 cm); pinkish gray (7.5YR 7/2) sandy clay loam, light brown (7.5YR 6/4), moist; 30 percent clay; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine tubular pores; few patchy distinct clay films on faces of peds; common fine carbonate masses and salt crystals; violently effervescent, 17 percent calcium carbonate equivalent; strongly alkaline, pH 8.8; clear wavy boundary.

2Bknz—49 to 60 inches (124 to 152 cm); pinkish gray (7.5YR 7/2) sandy clay loam, pinkish gray (7.5YR 7/2), moist; 30 percent clay; massive; hard, friable, moderately sticky and moderately plastic; few fine tubular pores; common fine carbonate masses and salt crystals; violently effervescent, 17 percent calcium carbonate equivalent; strongly alkaline, pH 8.8.

Range in Characteristics

Reaction: 7.9 to 9.0 (moderately to very strongly alkaline)

Average percent clay in the control section: 18 to 35 percent

A horizon

Hue: 7.5YR, 5YR

Value: 6 or 7 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: fine sandy loam

B horizons

Hue: 7.5YR, 5YR

Value: 5 to 7 dry, 4 to 7 moist

Chroma: 2 to 6, dry or moist

Texture: clay loam, sandy clay loam

Calcium carbonate equivalent: 10 to 25 percent

EC (mmhos/cm): 8 to 16

SAR: 13 to 200

This unit receives run-on moisture from adjacent areas. Concentration of water flow can cause severe erosion in the form of piping, head cutting, and gully erosion.

13—Cascabel soils, Wetrock soils, and Riverwash, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 2,220 to 2,750 feet (677 to 837 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Stream Segment Properties and Qualities

Segment length: about 20.5 miles of the San Pedro River starting 1 mile north of Zapata Wash to Clark Wash and from the Catalina Wash to the Pinal-Pima County line

Active flood plain width: 150 to 800 feet

Hydrology:

Stream flow: intermittent stream

Flooding hazard: frequent; long; 7 to 30 days

Flooding month: July–September and January–March

Water table depth: 10 to 60 inches

Water table kind: apparent

Water table present: year round

Bank entrenchment –

percent cut: 90

percent uncut: 10

vertical cut: 5 to 20 feet; averages 6 to 8 feet

Depositional bar features: dynamic system of interbraided bars and channels that relocate with each major flood event

Meander pattern: irregular meander

Channel composition:

percent bedrock: 0

percent cobbles: 30

percent gravel: 40

percent sand: 20

percent silt and clay: 10

Stability: a dynamic system of interbraided components that degrade and aggrade seasonally

Map Unit Composition

This is an undifferentiated map unit. These components are not consistently associated geographically. At least one component is present in every delineation, but each delineation can have any combination of the components. This map unit is not consistent over time. Its components consist of a dynamic interbraided system of bars and channels. The active stream dynamics of the San Pedro River cause these components to shift locations. The stream channel meanders across the floodplain, degrading and scouring, leaving behind Riverwash; and also aggrades and revegetates, producing Wetrock or Cascabel, depending on velocity of the deposited sediments. This map unit does not have permanent surface water, but can have surface water for up to 30 days.

Minor components: Quiburi, Typic Fluvaquents

Soil Properties and Qualities

Cascabel soils

Taxonomic classification: Sandy, mixed, thermic Oxyaquic Torrfluvents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

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moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 50 percent
woody debris: 10 percent
bare soil: 40 percent
rock fragments: 0 percent
Drainage class: moderately well drained
Ksat solum: 5.95 to 39.69 inches per hour (42.00 to 280.00 micrometers per second)
Available water capacity total inches: 3.9 (low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: frequent
Seasonal water table minimum depth: about 20 to 60 inches
Runoff class: negligible
Hydrologic group: B
Ecological site name: Prosopis velutina/Sporobolus wrightii
Ecological site number: F040XA124AZ
Present vegetation: spike dropseed, Bermuda grass, seepwillow baccharis, tamarisk, Fremont cottonwood, mesquite, singlewhorl burrobush
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Peppersause Wash; about 1,500 feet north and 1,900 feet west of the southeast corner of Section 16, Township 10 S, Range 18 E

Geographic Coordinate System:

32° 33' 55.00" north, 110° 30' 19.00" west

C1—0 to 6 inches (0 to 15 cm); brown (10YR 5/3) loamy fine sand, brown (10YR 4/3), moist; 6 percent clay; moderate thin platy structure parting to massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; common fine tubular pores; violently effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

C2—6 to 26 inches (15 to 66 cm); brown (10YR 5/3) sand, brown (10YR 4/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; common fine interstitial pores; strongly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

C3—26 to 39 inches (66 to 99 cm); brown (10YR 5/3) coarse sand, brown (10YR 4/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; common fine interstitial pores; 5 percent gravel; slightly effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C4—39 to 60 inches (99 to 152 cm); brown (10YR 5/3) stratified gravelly sand to fine sand, brown (10YR 4/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; few very fine roots; common fine interstitial pores; 20 percent gravel; slightly effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: 0 to 20 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

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Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 1 to 3 percent

C1 horizon

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4 dry or moist

Texture: loamy fine sand, very fine sandy loam, silt loam

C2–C4 horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 2 to 4, dry or moist

Texture: coarse sand, sand, fine sand, loamy sand, loamy fine sand with thin strata of sandy loam, silt loam, silty clay loam

Gypsum: 0 to 4 percent

Redoximorphic features: few to many redoximorphic concentrations occurring as masses and linings along root channels (7.5YR 5/8, 7.5YR 6/6); none to common redoximorphic depletions (5BG 5/1, 5BG3/1, 5B 3/1, 5B 2.5/1); usually occurs in strata finer than loamy fine sand

Wetrock soils

Taxonomic classification: Sandy-skeletal, mixed, thermic Oxyaquic Torrfluvents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 50 percent

woody debris: 10 percent

bare soil: 40 percent

rock fragments: 0 percent

Drainage class: moderately well drained

Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)

Available water capacity total inches: 2.8 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: frequent

Seasonal water table minimum depth: about 20 to 60 inches

Runoff class: very low

Hydrologic group: B

Ecological site name: Prosopis velutina/Sporobolus wrightii

Ecological site number: F040XA124AZ

Present vegetation: spike dropseed, Bermuda grass, seepwillow baccharis, tamarisk, Fremont cottonwood, mesquite, singlewhorl burrobush

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Peppersause Wash; about 1,600 feet north and 1,700 feet west of the southeast corner of Section 16, Township 10 S, Range 18 E

Geographic Coordinate System:

32° 33' 57.00" north, 110° 30' 20.00" west

C1—0 to 5 inches (0 to 13 cm); pale brown (10YR 6/3) silt loam, brown (10YR 4/3), moist; 10 percent clay; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and many medium roots; common fine tubular pores; 3 percent gravel; violently effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

C2—5 to 18 inches (13 to 46 cm); brown (10YR 5/3) gravelly coarse sand, brown (10YR 4/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; common fine interstitial pores; 20 percent gravel and 10 percent cobble; strongly effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C3—18 to 24 inches (46 to 61 cm); brown (10YR 5/3) sand, brown (10YR 4/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; common fine interstitial pores; 10 percent gravel; slightly effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C4—24 to 34 inches (61 to 86 cm); brown (10YR 5/3) very gravelly coarse sand, brown (10YR 4/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; common fine interstitial pores; 30 percent gravel and 10 percent cobble; strongly effervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

C5—34 to 60 inches (86 to 152 cm); brown (10YR 5/3) extremely gravelly sand, brown (10YR 4/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and fine and few coarse roots; common fine interstitial pores; 45 percent gravel and 25 percent cobble; slightly effervescent; slightly alkaline, pH 7.6.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 1 to 3 percent

C1 horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: coarse sand, fine sand, silt loam, fine sandy loam

C2–C5 horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: coarse sand, sand with thin strata of sandy loam, silt loam

Rock fragments: 10 to 70 percent, averages more than 35 percent

Gypsum: 0 to 4 percent

Redoximorphic features: few to common redoximorphic concentrations occurring as masses and linings along root channels (7.5YR 8/8, 7.5YR 6/6); few to common redoximorphic depletions (5BG 3/1, 10BG 3/1, 5B 3/1 10B 3/1); usually occurs in strata finer than loamy fine sand

Riverwash

Width: 2 to 15 feet

Depth: 0 to 36 inches

Riverwash consists of very deep, excessively drained, stratified sands, gravels, and cobbles from numerous sources. This material is part of a dynamic interbraided system of bars and channels, commonly bordered by shallow to steep vertical banks cut into the alluvium. It is not stable but is subject to shifting and sorting. It is usually dry but can be transformed into a temporary watercourse or a short-lived torrent after a heavy rain within the watershed. This material does not support vegetation because of the constant scouring and shifting it undergoes.

14—Cascabel soils, Wetrock soils, and Water, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,900 to 2,650 feet (579 to 808 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—1 Upper Sonoran Desert Shrub

Stream Segment Properties and Qualities

Segment length: about 44.5 miles of the San Pedro River, starting at the junction of the Gila and San Pedro Rivers at Winkelman, south to 1 mile north of Zapata Wash, and from Clark Wash to Catalina Wash

Average active channel width: 50 to 1,400 feet

Stream flow: perennial; minimum – 0 cubic feet per second, maximum – 13 cubic feet per second; average 5 cubic feet per second data from PZ Ranch crossing from August 1, 1999 to July 2001

Flooding hazard: very frequent; long; 7 to 30 days

Flooding month: July–September and January–March

Water table depth: 0 to 15 inches

Water table kind: apparent

Water table present: year round

Bank entrenchment –

percent cut: 90

percent uncut: 10

vertical cut: 2 to 40 feet; averages 3 to 4 feet

Depositional bar features: dynamic system of interbraided bars and channels that relocate with each major flood event

Meander pattern: irregular meander

Bank channel composition:

percent bedrock: 0

percent cobbles: 30

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percent gravel: 40
percent sand: 20
percent silt and clay: 10

Stability: a dynamic system of interbraided components that aggrade and degrade seasonally

Map Unit Composition

This is an undifferentiated map unit. These components are not consistently associated geographically. At least one component is present in every delineation, but each delineation can have any combination of the components. This map unit is not consistent over time. Its components consist of a dynamic interbraided system of bars and channels. The active stream dynamics of the San Pedro River cause these components to shift locations. The water channel meanders across the floodplain, leaving behind Wetrock or Cascabel soils, depending on the velocity of the deposited sediments. The water table level rises and falls with the seasons. Typic Fluvaquents can be found at the edge of the water. This map unit usually has surface water.

Minor components: Quiburi, Typic Fluvaquents, fine-silty and fine Oxyaquic Torrfluvents

Soil Properties and Qualities

Cascabel soils

Taxonomic classification: Sandy, mixed, thermic Oxyaquic Torrfluvents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 80 percent

woody debris: 25 percent

bare soil: 10 percent

rock fragments: 0 percent

Drainage class: moderately well drained

Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)

Available water capacity total inches: 3.6 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: frequent

Seasonal water table minimum depth: about 20 to 60 inches

Runoff class: very low

Hydrologic group: C

Ecological site name: Populus fremontii-Salix gooddingii/Sporobolus wrightii

Ecological site number: F040XA125AZ

Present vegetation: Fremont cottonwood, Gooding willow, tamarisk, burrobush, mesquite

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: UGSG Quadrangle—Lookout Mountain; about 1,100 feet south and 1,400 feet east of the northwest corner of Section 9, Township 7 S, Range 16 E

Geographic Coordinate System:

32° 50' 56.00" north, 110° 43' 4.00" west

C1—0 to 4 inches (0 to 10 cm); light brown (7.5YR 6/4) silt loam, brown (7.5YR 5/4), moist; 8 percent clay; moderate thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine tubular pores; 3 percent gravel; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C2—4 to 29 inches (10 to 74 cm); brown (7.5YR 5/3) sand, brown (7.5YR 4/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine and many medium roots; common fine interstitial pores; 5 percent gravel; slightly effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

C3—29 to 49 inches (74 to 124 cm); brown (7.5YR 5/3) very gravelly coarse sand, brown (7.5YR 4/4), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; few very fine roots; common fine interstitial pores; common distinct organic stains on faces of peds; few thin strata (1 inch to 6 inches thick, not continuous) silt loam with many distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine soft iron masses and linings along root channels; 45 percent gravel; slightly effervescent; moderately alkaline, pH 8.0; clear wavy boundary.

C4—49 to 58 inches (124 to 147 cm); brown (7.5YR 5/3) coarse sand, brown (7.5YR 4/4), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; few fine and coarse roots; common fine interstitial pores; 10 percent gravels; strongly effervescent; moderately alkaline, pH 8.0; clear wavy boundary.

C5—58 to 70 inches (147 to 178 cm); brown (7.5YR 5/3) coarse sand, dark brown (7.5YR 3/4), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; few fine roots and few coarse roots; common fine interstitial pores; 5 percent gravel; strongly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 5 to 45 percent, averages less than 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 1 to 3 percent

C1 horizon

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4 dry or moist

Texture: silt loam, fine sand, loamy fine sand

C2–C5 horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: coarse sand, sand, fine sand, loamy fine sand with thin strata of silt loam, silty clay loam, very fine sandy loam

Gypsum: 0 to 4 percent

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Redoximorphic features: few to many redoximorphic concentrations occurring as masses and linings along root channels (7.5YR 5/8, 7.5YR 6/6); none to common redoximorphic depletions (5BG 5/1, 5BG 3/1, 5B 3/1, 5B 2.5/1); usually occurs in strata finer than loamy fine sand

Wetrock soils

Taxonomic classification: Sandy-skeletal, mixed, thermic Oxyaquic Torrfluvents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 80 percent

 woody debris: 25 percent

 bare soil: 10 percent

rock fragments: 0 percent

Drainage class: moderately well drained

Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)

Available water capacity total inches: 3.1 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: frequent

Seasonal water table minimum depth: about 30 to 60 inches

Runoff class: very low

Hydrologic group: C

Ecological site name: Populus fremontii-Salix gooddingii/Sporobolus wrightii

Ecological site number: F040XA125AZ

Present vegetation: Fremont cottonwood, Gooding willow, tamarisk, burrobush, mesquite

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Lookout Mountain; about 1,200 feet south and 1,000 feet east of the northwest corner of Section 9, Township 7 S, Range 16 E

Geographic Coordinate System:

32° 50' 56.00" north, 110° 43' 15.00" west

C1—0 to 7 inches (0 to 18 cm); brown (10YR 5/3) very fine sandy loam, dark brown (10YR 3/3), moist; 7 percent clay; weak thick platy structure parting to massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine interstitial pores; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C2—7 to 38 inches (18 to 97 cm); brown (10YR 5/3) very gravelly coarse sand, brown (10YR 5/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and few medium roots; common fine interstitial pores;

55 percent gravel; slightly effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C3—38 to 71 inches (97 to 180 cm); brown (10YR 5/3) coarse sand, dark grayish brown (10YR 4/2), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; few medium roots; common fine interstitial pores; 6 percent gravel; slightly effervescent; slightly alkaline, pH 7.6.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 1 to 3 percent

C1 horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: coarse sand, fine sand, silt loam, loamy fine sand, very fine sandy loam

C2–C3 horizons

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 3 to 5 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: coarse sand, sand with thin strata of silt loam, silty clay loam, very fine sandy loam

Rock fragments: 5 to 60 percent, averages more than 35 percent

Gypsum: 0 to 4 percent

Redoximorphic features: common to many redoximorphic concentrations occurring as masses and linings along root channels (7.5YR 8/8, 7.5YR 6/6); few to common redoximorphic depletions (5BG 3/1, 10BG 3/1, 5B 3/1 10B 3/1); usually occurs in strata finer than loamy fine sand

Water

Width: 5 to 35 feet

Depth of water: 2 to 36 inches

15—Cellar-Anklam-Rock outcrop complex, 20 to 70 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 1,900 to 3,390 feet (578 to 1,034 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Cellar and similar soils: 45 percent

Anklam and similar soils: 30 percent

Rock outcrop: 20 percent

Minor components: Gran, Topawa and paralithic Cellar, lithic Anklam

Soil Properties and Qualities

Cellar soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 20 to 70 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 5 percent

 bare soil: 35 percent

rock fragments

 gravel: 45 percent

 cobble: 25 percent

 stone: 10 percent

Depth to restrictive feature(s): 6 to 20 inches to bedrock, lithic

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 0.8 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Shallow Hills 10–13" p.z.

Ecological site number: R040XA105AZ

Present vegetation: annual forbs, saguaro, false mesquite, bush muhly, slender grama, slender janusia, brittlebush, paloverde, ocotillo, purple threeawn, wolfberry, barrel cactus, pricklypear and cholla, clubmoss

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Tortolita Mountains; about 100 feet west and 1,500 feet south of the northeast corner of Section 21, Township 10 S, Range 12 E

Geographic Coordinate System:

32° 33' 2.00" north, 111° 6' 9.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 3/3), moist; 13 percent clay; weak fine granular parting to weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 40 percent gravel; noneffervescent; neutral, pH 6.8; clear smooth boundary.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

C—1 inch to 11 inches (3 to 28 cm); brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 3/3), moist; 15 percent clay; weak very fine and fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common very fine roots; common very fine irregular pores; 45 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

R—11 to 60 inches (28 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent gravel

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 7.5YR or 10YR

Value: 5 dry, 3 or 4 moist

Chroma: 4 dry, 3 or 4 moist

Texture: sandy loam

C horizon

Hue: 7.5YR or 10YR

Value: 5 dry, 3 or 4 moist

Chroma: 4 dry, 3 or 4 moist

Texture: sandy loam

R horizon

Granite bedrock

Anklam soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 20 to 50 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 35 percent

woody debris: 5 percent

bare soil: 35 percent

rock fragments

gravel: 55 percent

cobble: 25 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic; 20 to 40 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.2 (very low)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Shallow Hills 10–13" p.z.

Ecological site number: R040XA105AZ

Present vegetation: annual forbs, saguaro, false mesquite, bush muhly, slender grama, slender janusia, brittlebush, paloverde, ocotillo, purple threeawn, wolfberry, barrel cactus, pricklypear and cholla, clubmoss

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Tortolita Mountains; about 100 feet west and 1,650 feet south of the northeast corner of Section 21, Township 10 S, Range 12 E

Geographic Coordinate System:

32° 33' 0.00" north, 111° 6' 9.00" west

A—0 to 4 inches (0 to 10 cm); brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 3/2), moist; 17 percent clay; moderate very fine and fine granular structure; slightly hard, friable, nonsticky and nonplastic; many very fine roots; many fine irregular pores; 25 percent gravel and 5 percent cobble; noneffervescent; slightly acid, pH 6.4; abrupt smooth boundary.

Bt—4 to 14 inches (10 to 36 cm); reddish brown (5YR 5/4) very gravelly sandy clay loam, reddish brown (5YR 4/4), moist; 31 percent clay; strong fine and medium subangular blocky structure; hard, firm, moderately sticky and very plastic; common very fine roots; common very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 40 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 7.2; abrupt wavy boundary.

Crt—14 to 20 inches (36 to 51 cm); many continuous distinct clay films along fractures; weathered granite bedrock; abrupt wavy boundary.

R—20 to 60 inches (51 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 3 moist

Chroma: 4 dry, 2 or 3 moist

Texture: sandy loam

Rock fragments: 0 to 30 percent

Bt horizon

Hue: 5YR

Value: 5 dry, 4 moist

Chroma: 4 dry, 4 moist

Texture: sandy clay loam

Rock fragments: 35 to 60 percent

R horizon

Granite bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of granite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the summits.

16—Cellar-Rock outcrop complex, 20 to 70 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 1,900 to 4,190 feet (578 to 1,277 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Cellar and similar soils: 60 percent

Rock outcrop: 35 percent

Minor components: Anklam, Lehmans, Wikieup

Soil Properties and Qualities

Cellar soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 20 to 70 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 25 percent

 woody debris: 5 percent

 bare soil: 40 percent

rock fragments

 gravel: 60 percent

 cobble: 15 percent

Depth to restrictive feature(s): 6 to 15 inches to bedrock, paralithic; 8 to 20 inches to bedrock, lithic

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.5 (very low)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Shrink-swell potential: about 1.4 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Shallow Hills 10–13" p.z.

Ecological site number: R040XA105AZ

Present vegetation: annual forbs, triangle bursage, annual grasses, paloverde, saguaro, brittlebush, ocotillo, wolfberry, barrel cactus

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Desert Peak; about 1,800 feet east and 1,800 feet north of the southeast corner of Section 31, Township 9 S, Range 11 E

Geographic Coordinate System:

32° 36' 14.00" north, 111° 15' 3.00" west

A—0 to 2 inches (0 to 5 cm); yellowish brown (10YR 5/4) very gravelly sandy loam, dark brown (10YR 3/3), moist; 13 percent clay; weak thin platy parting to weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine vesicular pores; 50 percent gravel and 5 percent cobble; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C—2 to 12 inches (5 to 30 cm); yellowish brown (10YR 5/6) extremely gravelly sandy loam, dark yellowish brown (10YR 3/4), moist; 14 percent clay; weak very fine granular and subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine and medium irregular pores; 70 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Cr—12 to 14 inches (30 to 36 cm); weathered granite bedrock; abrupt wavy boundary.

R—14 to 60 inches (36 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Rock fragments: 35 to 75 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 4 dry, 3 or 4 moist

Texture: sandy loam

C horizons

Hue: 7.5 YR, 10YR

Value: 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy loam

Cr and R horizons

Granite bedrock

Not all pedons have paralithic material above bedrock. When present, it is less than 3 inches.

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of granite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

17—Cellar-Rock outcrop complex, 5 to 20 percent slopes

Map Unit Setting

Landform(s): hills

Elevation: 2,590 to 2,890 feet (790 to 880 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Cellar and similar soils: 60 percent

Rock outcrop: 30 percent

Minor components: Hayhook, Anklam, Gran, Pantano

Soil Properties and Qualities

Cellar soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 5 to 20 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 55 percent

 woody debris: 10 percent

 bare soil: 10 percent

rock fragments

 gravel: 75 percent

 cobble: 5 percent

 stone: 1 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 0.4 (very low)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Granitic Hills10–13" p.z.

Ecological site number: R040XA131AZ

Present vegetation: annual forbs, triangle bursage, annual grasses, jojoba, paloverde, saguaro, catclaw acacia, fishhook barrel cactus, ocotillo, buckwheat, pricklypear and cholla, spidergrass

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Ninetysix Hills SW; about 2,650 feet east and 1,050 feet north of the southwest corner of Section 32, Township 6 S, Range 12 E

Geographic Coordinate System:

32° 51' 45.20" north, 111° 7' 40.70" west

A—0 to 1 inch (0 to 3 cm); yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3), moist; 7 percent clay; weak medium platy parting to weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine tubular pores; 40 percent gravel; noneffervescent; neutral, pH 7.2; clear smooth boundary.

C—1 inch to 6 inches (3 to 15 cm); yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3), moist; 12 percent clay; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; common very fine tubular pores; 40 percent gravel; noneffervescent; neutral, pH 7.2; abrupt wavy boundary.

R—6 to 60 inches (15 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent gravel

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 4 dry, 3 or 4 moist

Texture: sandy loam

C horizon

Hue: 7.5 YR, 10YR

Value: 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy loam

R horizon

Granite bedrock

Some pedons have paralithic material above bedrock. When present, it is less than 3 inches.

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of

granite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

18—Cherioni-Rock outcrop complex, 3 to 30 percent slopes

Map Unit Setting

Landform(s): hills

Elevation: 1,650 to 2,000 feet (502 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Cherioni and similar soils: 80 percent

Rock outcrop: 20 percent

Minor components: Beardsley, Hickiwan, soils that do not have a hardpan over bedrock, soils that have less than 35 percent rock fragments.

Soil Properties and Qualities

Cherioni soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic, shallow
Typic Haplodurids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from volcanic rock

Slope: 3 to 30 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 20 percent

rock fragments

 gravel: 40 percent

 cobble: 10 percent

Depth to restrictive feature(s): 5 to 20 inches to duripan; 6 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.57 to 1.98 inches per hour (4.00 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Available water capacity total inches: 0.8 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Basalt Hills 7–10" p.z.

Ecological site number: R040XB201AZ

Present vegetation: white brittlebush, creosotebush, ironwood, paloverde, pricklypear and cholla, ocotillo

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Hill; about 400 feet north and 2,300 feet west of the southeast corner of Section 29, Township 3 S, Range 9 E

Geographic Coordinate System:

33° 8' 19.51" north, 111° 20' 47.63" west

A—0 to 1 inch (0 to 3 cm); light brown (7.5YR 6/4) very cobbly very fine sandy loam, brown (7.5YR 5/4), moist; 15 percent clay; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common fine irregular pores; 40 percent cobble; slightly effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Bk1—1 inch to 8 inches (3 to 20 cm); light brown (7.5YR 6/4) very gravelly very fine sandy loam, brown (7.5YR 5/4), moist; 18 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many fine irregular pores; many continuous distinct carbonate coats on rock fragments; 50 percent gravel; violently effervescent; moderately alkaline, pH 8.4; abrupt smooth boundary.

Bk2—8 to 10 inches (20 to 25 cm); light brown (7.5YR 6/4) very gravelly very fine sandy loam, brown (7.5YR 5/4), moist; 18 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many fine irregular pores; many continuous distinct carbonate coats on rock fragments; 50 percent gravel; violently effervescent; moderately alkaline, pH 8.4; abrupt smooth boundary.

Bkqm—10 to 12 inches (25 to 30 cm); extremely hard; cemented material, indurated; duripan; abrupt wavy boundary.

R—12 to 60 inches (30 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 15 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 6 to 8 dry, 3 to 6 moist

Chroma: 2 to 4 dry, 4 or 5 moist

Texture: very fine sandy loam, fine sandy loam

B horizon

Hue: 10YR, 7.5YR, 5YR

Value: 5 to 7 dry, 4 or 5 moist

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chroma: 4 dry, 4 or 6 moist
Texture: very fine sandy loam, fine sandy loam, loam
Calcium carbonate equivalent: 10 to 15 percent

Bkm horizon

Cemented: calcium carbonate and silica
Hardness: indurated
Thickness: 1 to 5 inches – continuous

R horizon

Basalt and volcanic bedrocks

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of basalt and volcanic bedrocks. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

19—Chiricahua, Deloro, and Lampshire soils, 5 to 60 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 2,990 to 3,890 feet (912 to 1,186 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Undifferentiated groups consist of two or more components that are not consistently associated geographically and therefore do not always occur together in the same map unit delineation. Each delineation has at least one of the major components, and some may have all of them.

Minor components: Tombstone, Kimrose, Sasabe, Leyte, Romero

Soil Properties and Qualities

Chiricahua soils

Taxonomic classification: Fine, mixed, superactive, thermic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from quartzite

Slope: 5 to 60 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Physical cover
canopy plant cover: 40 percent
woody debris: 20 percent
bare soil: 15 percent
rock fragments
gravel: 65 percent
cobble: 15 percent
stone: 5 percent
Depth to restrictive feature(s): 40 to 60 inches to bedrock, paralithic
Drainage class: well drained
Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 6.5 (moderate)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: very high
Hydrologic group: C
Ecological site name: Volcanic Hills 12–16" p.z. Clayey
Ecological site number: R041XC330AZ
Present vegetation: annual forbs, false mesquite, broom snakeweed, turpentine bush, mesquite, whitethorn, jojoba, filaree, condalia, globemallow, wolfberry
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Crozier Peak; about 2,500 feet west and 1,000 feet south of the northeast corner of Section 12, Township 6 S, Range 13 E

Geographic Coordinate System:

32° 55' 45.70" north, 110° 57' 20.70" west

A—0 to 4 inches (0 to 10 cm); brown (7.5YR 4/3) very gravelly sandy loam, dark brown (7.5YR 3/4), moist; 8 percent clay; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 40 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 7.0; clear wavy boundary.

Bt1—4 to 10 inches (10 to 25 cm); brown (7.5YR 4/4) gravelly clay loam, reddish brown (5YR 4/4), moist; 38 percent clay; moderate medium and coarse subangular blocky structure; moderately hard, friable, very sticky and very plastic; many very fine and common fine roots; many very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 25 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

Bt2—10 to 20 inches (25 to 51 cm); reddish brown (5YR 4/4) gravelly clay, reddish brown (5YR 4/4), moist; 55 percent clay; strong medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine and medium roots; common very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 25 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Bt3—20 to 30 inches (51 to 76 cm); reddish brown (5YR 4/4) clay, yellowish red (5YR 4/6), moist; 50 percent clay; moderate fine and medium subangular blocky structure; very hard, very firm, very sticky and very plastic; common very fine roots; few very fine tubular pores; many continuous distinct clay films on faces of peds and rock

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

fragments; 5 percent gravel; noneffervescent; neutral, pH 6.6; gradual wavy boundary.

BCt—30 to 48 inches (76 to 122 cm); 30 percent reddish brown (5YR 4/4) and 70 percent pink (7.5YR 7/3) clay, 30 percent strong brown (7.5YR 5/6) and 70 percent light brown (7.5YR 6/4), moist; 50 percent clay; moderate fine and medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; neutral, pH 6.8; clear wavy boundary.

Crt—48 to 60 inches (122 to 152 cm); common continuous distinct clay films on bedrock; weathered quartzite bedrock.

Range in Characteristics

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 6 dry, 2 to 4 moist

Texture: loam, sandy loam, clay loam

Rock fragments: 30 to 45 percent

Bt horizons

Hue: 7.5YR, 5YR

Value: 3 or 4 dry, 3 to 5 moist

Chroma: 3 to 6 dry or moist

Texture: clay loam, clay

Rock fragments: 5 to 30 percent

BCt horizon

Hue: 7.5YR, 5YR

Value: 4 to 7 dry, 4 to 6 moist

Chroma: 3 to 6 dry or moist

Texture: clay loam, clay

Rock fragments: 0 to 20 percent

Crt horizon

Quartzite or shale bedrocks. Some sites have lithic bedrocks.

Chiricahua as used in this mapping unit is a taxadjunct to the series because the depth to weathered bedrock is greater than 20 inches. Chiricahua series is Clayey, mixed, superactive, thermic, shallow Ustic Haplargids.

Deloro soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic, shallow Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from quartzite

Slope: 5 to 60 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 40 percent
woody debris: 10 percent
bare soil: 15 percent
rock fragments
gravel: 65 percent
cobble: 15 percent
Depth to restrictive feature(s): 5 to 20 inches to bedrock, paralithic; 10 to 20 inches to bedrock, lithic
Drainage class: well drained
Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)
Available water capacity total inches: 0.8 (very low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: very high
Hydrologic group: D
Ecological site name: Volcanic Hills 12–16" p.z. Clayey
Ecological site number: R041XC330AZ
Present vegetation: annual forbs, mesquite, broom snakeweed, filaree, turpentine bush, whitethorn, false mesquite, jojoba, wolfberry, condalia, globemallow
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Crozier Peak; about 2,376 feet west and 1,135 feet south of the northeast corner of Section 12, Township 6 S, Range 13 E

Geographic Coordinate System:

32° 55' 44.80" north, 110° 57' 20.40" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/3) very gravelly sandy loam, dark brown (7.5YR 3/2), moist; 10 percent clay; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine irregular pores; 35 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Bt—2 to 10 inches (5 to 25 cm); reddish brown (5YR 4/3) very gravelly clay, yellowish red (5YR 4/6), moist; 50 percent clay; strong medium subangular blocky structure; very hard, firm, very sticky and very plastic; many very fine and few fine and medium roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 40 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Crt—10 to 14 inches (25 to 36 cm); many continuous distinct clay films on bedrock; weathered quartzite bedrock.

R—14 to 60 inches (36 to 152 cm); unweathered quartzite bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

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Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: sandy loam, loam

Bt horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 4 or 6 moist

Texture: clay loam, clay

Crt and R horizons

Quartzite or shale bedrocks. Some pedons do not have lithic bedrocks below 15 inches.

Lampshire soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from quartzite

Slope: 5 to 60 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 20 percent

bare soil: 15 percent

rock fragments

gravel: 65 percent

cobble: 15 percent

stone: 5 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.4 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Granitic Hills 12–16" p.z.

Ecological site number: R041XC306AZ

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Present vegetation: annual forbs, mesquite, turpentine bush, broom snakeweed, whitethorn, false mesquite, filaree, jojoba, wolfberry, condalia, globemallow
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Crozier Peak; about 2,475 feet west and 1,082 feet south of the northeast corner of Section 12, Township 6 S, Range 13 E

Geographic Coordinate System:

32° 55' 45.30" north, 110° 57' 21.50" west

A—0 to 5 inches (0 to 13 cm); brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; moderate fine and medium granular structure; soft, loose, nonsticky and nonplastic; many very fine and few medium and very coarse roots; many fine irregular pores; 45 percent gravel; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

R—5 to 60 inches (13 to 152 cm); unweathered quartzite bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 7 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sandy loam, loam

R horizons

Quartzite or shale bedrocks

20—Chiricahua-Deloro-Leyte soils, 10 to 50 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 3,580 to 4,670 feet (1,090 to 1,424 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 57 to 65 degrees F (13.9 to 18.3 degrees C)

Mean annual soil temperature: 59 to 67 degrees F (15.0 to 19.4 degrees C)

Frost-free period: 170 to 220 days

Major Land Resource Area: 38—Mogollon Transition

Land Resource Unit: 38-1 Lower Interior Chaparral

Map Unit Composition

Undifferentiated groups consist of two or more components that are not consistently associated geographically and therefore do not always occur together in the same map unit delineation. Each delineation has at least one of the major components, and some may have all of them.

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Minor components: Schrap, Lampshire, Oracle, Pantak, Holgiun, soils that are very deep and clayey-skeletal

Soil Properties and Qualities

Chiricahua soils

Taxonomic classification: Fine, mixed, superactive, thermic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from metamorphic and sedimentary rock

Slope: 10 to 50 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 10 percent

bare soil: 35 percent

rock fragments

gravel: 15 percent

cobble: 5 percent

Depth to restrictive feature(s): 20 to 40 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 4.9 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Volcanic Hills 12–16" p.z. Clayey

Ecological site number: R038XA117AZ

Present vegetation: curly mesquite, annual forbs, false mesquite, pricklypear and cholla, turbinella oak, ocotillo, perennial forbs, shrubby buckwheat, agave, range ratany, mesquite

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hot Tamale Peak; about 1,750 feet east and 1,400 feet north of the southwest corner of Section 30, Township 2 S, Range 14 E

Geographic Coordinate System:

33° 13' 30.70" north, 110° 57' 30.50" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/4) gravelly clay loam, dark brown (7.5YR 3/4), moist; 40 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, moderately sticky and moderately plastic; many very fine

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and fine roots; common very fine vesicular and interstitial pores; 15 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt1—2 to 9 inches (5 to 23 cm); reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4), moist; 50 percent clay; strong fine and medium subangular blocky structure; soft, friable, very sticky and very plastic; common very fine and fine and few medium roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt2—9 to 25 inches (23 to 64 cm); reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4), moist; 55 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt3—25 to 36 inches (64 to 91 cm); reddish brown (2.5YR 5/4) gravelly clay, reddish brown (2.5YR 4/4), moist; 55 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 15 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Crt—36 to 60 inches (91 to 152 cm); many continuous distinct clay films along fractures; weathered quartzite bedrock.

Range in Characteristics

Rock fragments: 0 to 15 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 to 4 dry or moist

Texture: sandy loam, loam, clay loam

Bt horizons

Hue: 2.5YR, 5YR

Value: 3 or 5 dry or moist

Chroma: 3 to 6 dry or moist

Texture: clay loam, clay

Crt horizon

Quartzite or shale bedrock.

Some pedons have lithic bedrocks.

Chiricahua as used in this mapping unit is a taxadjunct to the series because the depth to weathered bedrock is greater than 20 inches. Chiricahua series is Clayey, mixed, superactive, thermic, shallow Ustic Haplargids.

Deloro soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from metamorphic and sedimentary rock

Slope: 10 to 50 percent

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Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 10 percent

bare soil: 15 percent

rock fragments

gravel: 45 percent

cobble: 25 percent

Depth to restrictive feature(s): 20 to 30 inches to bedrock, paralithic; 25 to 40 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.8 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Volcanic Hills 12–16" p.z. Clayey

Ecological site number: R038XA117AZ

Present vegetation: curly mesquite, annual forbs, false mesquite, pricklypear and cholla, turbinella oak, ocotillo, perennial forbs, shrubby buckwheat, agave, range ratany, mesquite

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hot Tamale Peak; about 1,920 feet east and 235 feet south of the northwest corner of Section 31, Township 2 S, Range 14 E

Geographic Coordinate System:

33° 13' 14.50" north, 110° 57' 28.40" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/3) very gravelly loam, dark brown (7.5YR 3/3), moist; 19 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, moderately sticky and moderately plastic; many very fine and fine roots; common very fine vesicular and irregular pores; 50 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

Bt1—2 to 10 inches (5 to 25 cm); dark reddish brown (5YR 3/3) very gravelly clay loam, dark reddish brown (5YR 3/3), moist; 33 percent clay; strong fine subangular blocky structure; soft, very friable, very sticky and very plastic; many fine and medium roots; many very fine and fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 50 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

Bt2—10 to 26 inches (25 to 66 cm); dark reddish brown (5YR 3/3) extremely gravelly clay, dark reddish brown (5YR 3/4), moist; 45 percent clay; strong fine and medium

subangular blocky structure; slightly hard, firm, very sticky and very plastic; common fine and medium roots; many very fine and fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 70 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Crt—26 to 35 inches (66 to 89 cm); many continuous distinct clay films along fractures; weathered quartzite bedrock.

R—35 to 60 inches (89 to 152 cm); unweathered quartzite bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 to 4 dry or moist

Texture: sandy loam, loam

Bt horizons

Hue: 2.5YR, 5YR

Value: 3 or 4 dry or moist

Chroma: 3 or 4 dry or moist

Texture: clay loam, clay

Crt and R horizon

Quartzite or shale bedrock

Deloro as used in this mapping unit is a taxadjunct to the series because the depth to the weathered bedrock is greater than 20 inches. Deloro series is Clayey-skeletal, mixed, superactive, thermic, shallow Ustic Haplargids

Leyte soils

Taxonomic classification: Clayey, mixed, superactive, thermic Lithic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from metamorphic and sedimentary rock

Slope: 10 to 50 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 20 percent

bare soil: 15 percent

rock fragments

gravel: 45 percent

cobble: 20 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

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Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 2.0 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 12–16" p.z. Clayey

Ecological site number: R038XA117AZ

Present vegetation: curly mesquite, annual forbs, false mesquite, pricklypear and cholla, turbinella oak, ocotillo, perennial forbs, shrubby buckwheat, agave, range ratany, mesquite

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hot Tamale Peak; about 1,900 feet west and 235 feet south of the northeast corner of Section 7, Township 3 S, Range 14 E

Geographic Coordinate System:

33° 11' 30.10" north, 110° 57' 12.70" west

A—0 to 4 inches (0 to 10 cm); brown (7.5YR 4/3) very gravelly loam, dark brown (7.5YR 3/2), moist; 19 percent clay; moderate very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; 50 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

Bt1—4 to 13 inches (10 to 33 cm); dark reddish brown (5YR 3/3) very gravelly clay, dark reddish brown (5YR 3/3), moist; 45 percent clay; moderate very fine and fine subangular blocky structure; soft, very friable, very sticky and very plastic; many very fine and fine roots; many very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 35 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Bt2—13 to 19 inches (33 to 48 cm); reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4), moist; 55 percent clay; strong fine and medium subangular blocky structure; slightly hard, firm, very sticky and very plastic; common very fine and fine and few coarse roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

R—19 to 60 inches (48 to 152 cm); unweathered quartzite bedrock.

Range in Characteristics

Rock fragments: 10 to 50 percent averages less than 35 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 to 4 dry or moist

Texture: sandy loam, loam

Bt horizons

Hue: 2.5YR, 5YR

Value: 3 or 4 dry or moist
Chroma: 3 to 6 dry or moist
Texture: clay loam, clay, sandy clay

R horizon

Quartzite or shale bedrock.

21—Chiricahua-Mallet complex, 1 to 15 percent slopes

Map Unit Setting

Landform(s): Chiricahua – pediments; Mallet – alluvial fans

Elevation: 3,090 to 4,480 feet (942 to 1,365 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41–3 Southern Arizona Semidesert Grassland

Map Unit Composition

Chiricahua and similar soils: 50 percent

Mallet and similar soils: 35 percent

Minor components: Baboquivari, Romero, Stronghold, Riverwash, Oracle, Sasabe, Combate

Soil Properties and Qualities

Chiricahua soils

Taxonomic classification: Clayey, mixed, superactive, thermic, shallow Ustic
Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 1 to 15 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 90 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 25 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.6 (low)

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Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: medium

Hydrologic group: C

Ecological site name: Loamy Upland 12–16" p.z.

Ecological site number: R041XC313AZ

Present vegetation: mesquite, turpentine bush, annual forbs, curly mesquite, sideoats grama, pricklypear and cholla, spidergrass, Lehmann's lovegrass, plains lovegrass, pricklypear, perennial forbs, purple threeawn, sacahuista

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Mountain; about 1,100 feet east and 900 feet south of the northwest corner of Section 10, Township 7 S, Range 14 E

Geographic Coordinate System:

32° 50' 43.10" north, 110° 53' 37.40" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) loam, dark brown (7.5YR 3/3), moist; 19 percent clay; weak thin platy parting to weak very fine subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; many very fine irregular pores; 10 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt smooth boundary.

Bt1—2 to 9 inches (5 to 23 cm); reddish brown (5YR 5/4) clay, yellowish red (5YR 4/6), moist; 41 percent clay; strong fine and medium subangular blocky structure; hard, very firm, very sticky and very plastic; common very fine and few medium roots; many fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; slightly acid, pH 6.4; clear smooth boundary.

Bt2—9 to 17 inches (23 to 43 cm); reddish brown (5YR 5/4) clay, yellowish red (5YR 4/6), moist; 45 percent clay; strong medium and coarse subangular blocky structure; very hard, extremely firm, very sticky and very plastic; common very fine and few medium roots; many fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Crt—17 to 60 inches (43 to 152 cm); many continuous distinct clay films along fractures; weathered granite grus bedrock.

Range in Characteristics

Rock fragments: 5 to 15 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

Bt horizons

Hue: 5YR

Value: 4 or 5 dry, 3 or 4 moist

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Chroma: 3 to 6, dry or moist

Texture: clay, clay loam

Crt horizon

Granite bedrock

Mallet soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Ustic Haplocambids

Geomorphic position: proximal and distal

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 90 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 30 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 6.1 (moderate)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: rare

Runoff class: very low

Hydrologic group: B

Ecological site name: Sandy Loam 12–16" p.z. Deep

Ecological site number: R041XC318AZ

Present vegetation: mesquite, annual forbs, needle grama, sideoats grama, pricklypear and cholla, spidergrass, perennial forbs

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Mountain; about 500 feet east and 1,100 feet south of the northwest corner of Section 10, Township 7 S, Range 14 E

Geographic Coordinate System:

32° 50' 39.00" north, 110° 53' 42.70" west

A—0 to 6 inches (0 to 15 cm); brown (7.5YR 5/3) gravelly sandy loam, dark brown (7.5YR 3/3), moist; 10 percent clay; weak thin platy parting to weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 30 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt smooth boundary.

Bw1—6 to 25 inches (15 to 64 cm); brown (7.5YR 4/3) gravelly sandy loam, dark brown (7.5YR 3/2), moist; 11 percent clay; weak very fine and fine subangular blocky

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structure; soft, very friable, moderately sticky and moderately plastic; common very fine roots; common fine irregular pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

Bw2—25 to 60 inches (64 to 152 cm); dark brown (7.5YR 3/2) gravelly sandy clay loam, black (7.5YR 2.5/1), moist; 23 percent clay; moderate very fine and fine subangular blocky structure; slightly hard, firm, very sticky and moderately plastic; few very fine roots; common fine irregular pores; few continuous distinct clay films between sand grains; 25 percent gravel; noneffervescent; neutral, pH 6.6.

Range in Characteristics

Rock fragments: 0 to 35 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 7 to 18 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam

Bw horizons

Hue: 7.5YR

Value: 2.5 to 4, dry or moist

Chroma: 1 to 3, dry or moist

Texture: loam, sandy loam, sandy clay loam

22—Collarbutton-Rock outcrop-Cherrycow complex, 10 to 60 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 4,400 to 6,300 feet (1,341 to 1,920 meters)

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

Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)

Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)

Frost-free period: 160 to 210 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-1 Mexican Oak-Pine Woodland and Oak Savannah

Map Unit Composition

Collarbutton and similar soils: 50 percent

Rock outcrop: 30 percent

Cherrycow and similar soils: 15 percent

Minor components: Collarbutton soils that have greater than 35 percent rock fragments and clay, Cherrycow soils that are very shallow to shallow, Riverwash

Soil Properties and Qualities

Collarbutton soils

Taxonomic classification: Loamy, mixed, superactive, thermic Aridic Lithic Argiustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from andesite

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Slope: 10 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 75 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 20 percent

 cobble: 10 percent

Depth to restrictive feature(s): 7 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.20 to 0.57 inches per hour (1.40 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.9 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 16–20" p.z.

Ecological site number: R041XA111AZ

Present vegetation: sideoats grama, juniper, annual grasses, mesquite, annual forbs, cane beardgrass, perennial forbs, plains lovegrass, Emory oak, buckbrush, sacahuista, yerba de pasmo, beggartick threeawn, bullgrass, hairy grama, mountain mahogany, purple grama

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oak Grove Canyon; about 450 feet west and 700 feet north of the southeast corner of Section 23, Township 7 S, Range 18 E

Geographic Coordinate System:

32° 48' 16.00" north, 110° 28' 3.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 4/3) gravelly sandy clay loam, very dark brown (7.5YR 2.5/2), moist; 24 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; few fine irregular pores; 25 percent gravel; noneffervescent; neutral, pH 7.2; abrupt smooth boundary.

Bt—1 inch to 12 inches (3 to 30 cm); brown (7.5YR 4/3) sandy clay loam, dark brown (7.5YR 3/3), moist; 29 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine roots; common fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

R—12 to 60 inches (30 to 152 cm); unweathered andesite bedrock.

Range in Characteristics

Rock fragments: 0 to 25 percent
Organic matter: 1 to 3 percent
Reaction: 6.6 to 7.8 (neutral to slightly alkaline)
Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR, 2.5YR
Value: 4 dry, 2 or 3 moist
Chroma: 2 or 3, dry or moist
Texture: clay loam, sandy clay loam

Bt horizon

Hue: 7.5YR, 2.5YR
Value: 4 dry, 2 or 3 moist
Chroma: 2 or 3, dry or moist
Texture: sandy clay loam, clay loam, clay

R horizon

Andesite and volcanic bedrocks

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of andesite and some basalt. There are inclusions of limestone rock outcrop. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Cherrycow soils

Taxonomic classification: Fine, smectitic, thermic Aridic Argiustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from andesite

Slope: 10 to 30 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 75 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 80 percent

cobble: 5 percent

Depth to restrictive feature(s): 20 to 40 inches to bedrock, lithic

Drainage class: moderately well drained

Ksat solum: 0.00 to 0.57 inches per hour (0.01 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 3.8 (low)

Shrink-swell potential: about 10.0 LEP (very high)

Flooding hazard: none

Runoff class: very high

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Hydrologic group: D

Ecological site name: Clayey Slopes 16–20" p.z.

Ecological site number: R041XA118AZ

Present vegetation: annual forbs, annual grasses, curly mesquite, mesquite, perennial forbs, sideoats grama, mimosa, sacahuista, vine mesquite, oneseed juniper

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oak Grove Canyon; about 500 feet west and 600 feet north of the southeast corner of Section 24, Township 7 S, Range 18 E

Geographic Coordinate System:

32° 48' 15.00" north, 110° 28' 0.00" west

A—0 to 2 inches (0 to 5 cm); dusky red (2.5YR 3/2) gravelly clay loam, dark reddish brown (2.5YR 2.5/3), moist; 28 percent clay; moderate very fine and fine subangular blocky structure; slightly hard, friable, very sticky and very plastic; many very fine roots; many very fine tubular pores; 20 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt1—2 to 16 inches (5 to 41 cm); reddish brown (2.5YR 4/3) clay, dark reddish brown (2.5YR 2.5/3), moist; 43 percent clay; strong fine, medium and coarse angular blocky structure; hard, firm, very sticky and very plastic; common very fine and few medium roots; common very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; neutral, pH 7.0; clear smooth boundary.

Bt2—16 to 25 inches (41 to 64 cm); reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 2.5/4), moist; 59 percent clay; strong fine, medium, and coarse angular blocky structure; very hard, firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 7.2; abrupt wavy boundary.

R—25 to 60 inches (64 to 152 cm); unweathered andesite bedrock.

Range in Characteristics

Rock fragments: 0 to 20 percent

Organic matter: 1 to 3 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 45 to 60 percent

A horizon

Hue: 7.5YR, 2.5YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam, clay loam

Bt horizon

Hue: 7.5YR, 2.5YR

Value: 4 dry, 2 to 4 moist

Chroma: 2 to 4, dry or moist

Texture: clay

R horizon

Andesite and volcanic bedrocks

23—Combate coarse sandy loam, 1 to 5 percent slopes

Map Unit Setting

Landform(s): alluvial fans

Elevation: 3,200 to 4,000 feet (975 to 1,219 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Combate and similar soils: 90 percent

Minor components: Riverwash, Combate soils that have sand or loamy sand textures

Soil Properties and Qualities

Combate soils

Taxonomic classification: Coarse-loamy, mixed, superactive, nonacid, thermic Ustic
Torrifluvents

Geomorphic position: proximal and distal

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover 35 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 50 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 4.8 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: rare

Runoff class: very low

Hydrologic group: A

Ecological site name: Sandy Loam 12-16" p.z. Deep

Ecological site number: R041XC318AZ

Present vegetation: turbinella oak, common juniper, sideoats grama, pointleaf

 manzanita, true mountain mahogany, hoptree, singleleaf pinyon, Lehmann's

 lovegrass, plains lovegrass, perennial forbs, sacahuista, shrubby buckwheat,

 mesquite

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Mountain; about 2,200 feet east and 2,500 feet south of the northwest corner of Section 10, Township 8 S, Range 14 E

Geographic Coordinate System:

32° 45' 13.25" north, 110° 53' 53.56" west

A—0 to 2 inches (0 to 5 cm); grayish brown (10YR 5/2) coarse sandy loam, very dark brown (10YR 2/2), moist; 12 percent clay; weak medium platy parting to weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine irregular pores; 10 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

C1—2 to 45 inches (5 to 114 cm); brown (10YR 4/3) gravelly coarse sandy loam, very dark brown (10YR 2/2), moist; 13 percent clay; massive; soft, very friable, nonsticky and slightly plastic; common very fine and few medium and coarse roots; common fine irregular pores; 20 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

C2—45 to 60 inches (114 to 152 cm); brown (10YR 4/3) gravelly loamy coarse sand, dark brown (10YR 3/3), moist; 13 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 30 percent gravel; noneffervescent; neutral, pH 6.6.

Range in Characteristics

Rock fragments: 0 to 30 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 5 to 18 percent

A and C horizons

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3, dry or moist

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

24—Contine loam, 0 to 3 percent slopes

Map Unit Setting

Landform(s): basin floors, fan terraces

Elevation: 1,540 to 2,000 feet (468 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Contine and similar soils: 90 percent

Minor components: Denure, Mohall, Central Arizona Project Canal

Soil Properties and Qualities

Contine soils

Taxonomic classification: Fine, mixed, superactive, hyperthermic Vertic Calciargids

Geomorphic position: drainageways and summits

Parent material: mixed fan alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 60 percent

 bare soil: 35 percent

rock fragments

 gravel: 5 percent

Drainage class: well drained

Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

Available water capacity total inches: 9.9 (high)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: very rare

Runoff class: low

Hydrologic group: C

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: mesquite, creosotebush, ironwood, triangle bursage, annual grasses

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Magma; about 400 feet south and 2,000 feet east of the northwest corner of Section 25, Township 3 S, Range 9 E

Geographic Coordinate System:

33° 8' 42.00" north, 111° 22' 26.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) loam, brown (7.5YR 4/4), moist; 24 percent clay; strong medium platy structure; soft, very friable, nonsticky and slightly plastic; common fine vesicular pores; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—2 to 25 inches (5 to 64 cm); reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/3), moist; 36 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and moderately plastic; few very fine roots; common fine tubular pores; few continuous distinct clay films on faces of peds; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Btk1—25 to 35 inches (64 to 89 cm); reddish brown (5YR 4/4) clay, reddish brown (5YR 4/4), moist; 49 percent clay; moderate medium and coarse prismatic parting to strong fine and medium angular blocky structure; hard, firm, moderately sticky and very plastic; few very fine roots; many fine tubular pores; common continuous

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prominent clay films on faces of peds; many fine carbonate filaments and very fine and fine carbonate masses; strongly effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Btk2—35 to 60 inches (89 to 152 cm); brown (7.5YR 5/4) clay, strong brown (7.5YR 4/6), moist; 44 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common fine tubular pores; common continuous prominent clay films on faces of peds; many fine and medium carbonate masses and filaments; few fine manganese coatings on faces of peds; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 35 to 55 percent

A horizon

Hue: 7.5YR

Value: 5 or 6 dry, 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: clay loam, loam, sandy clay loam

Bt horizon

Hue: 5YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: clay loam, clay, sandy clay loam

Calcium carbonate equivalent: 5 to 20 percent

Btk horizon

Hue: 5YR, 7.5YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 4 to 6 dry, 3 to 6 moist

Texture: clay loam, clay

Calcium carbonate equivalent: 15 to 35 percent

This unit receives run-on moisture in the form of sheet flow.

25—Coolidge-Gunsight complex, 1 to 5 percent slopes

Map Unit Setting

Landform(s): Coolidge – stream terraces; Gunsight – fan terraces

Elevation: 1,500 to 1,990 feet (457 to 608 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Coolidge and similar soils: 55 percent

Gunsight and similar soils: 25 percent

Minor components: Contine, Denure, Laveen, Guvo, Hickiwan, Pinamt, Central Arizona Project Canal

Soil Properties and Qualities

Coolidge soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids

Geomorphic position: toeslopes

Parent material: mixed fan and stream alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 25 percent

 woody debris: 5 percent

 bare soil: 45 percent

rock fragments

 gravel: 25 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 6.8 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: B

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: creosotebush, white bursage, barrel cactus, paloverde, staghorn cholla

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 400 feet south and 1,500 feet west of the northeast corner of Section 14, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 17.00" north, 111° 17' 34.00" west

A—0 to 2 inches (0 to 5 cm); light brown (7.5YR 6/3) fine sandy loam, brown (7.5YR 4/4), moist; 11 percent clay; weak thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; 5 percent gravel; violently effervescent, 7 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk1—2 to 24 inches (5 to 61 cm); light brown (7.5YR 6/3) fine sandy loam, brown (7.5YR 4/3), moist; 11 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; common continuous distinct carbonate coats on rock fragments; common fine carbonate masses; 10 percent gravel; violently effervescent,

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12 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bk2—24 to 38 inches (61 to 97 cm); pinkish gray (7.5YR 7/2) sandy loam, brown (7.5YR 4/3), moist; 9 percent clay; moderate fine and medium subangular blocky structure; slightly hard, firm, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine tubular pores; common continuous distinct carbonate coats on faces of peds; many carbonate masses and filaments; violently effervescent, 17 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bk3—38 to 60 inches (97 to 152 cm); light brown (7.5YR 6/3) sandy loam, brown (7.5YR 4/3), moist; 14 percent clay; moderate medium and coarse subangular blocky extremely hard, extremely firm, slightly sticky and slightly plastic; common very fine roots; many very fine and fine tubular pores; many continuous distinct carbonate coats on faces of peds; many carbonate masses and filaments; violently effervescent, 10 percent calcium carbonate equivalent; moderately alkaline, pH 8.4.

Range in Characteristics

Rock fragments: 0 to 10 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 4 moist

Chroma: 3 or 4, dry or moist

Texture: fine sandy loam, sandy loam

Bk horizons

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 4 or 5 moist

Chroma: 2 to 4, dry or moist

Texture: fine sandy loam, sandy loam

Calcium carbonate equivalent: 5 to 20 percent

Gunsight soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 30 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 75 percent

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cobble: 10 percent
Drainage class: somewhat excessively drained
Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)
Available water capacity total inches: 2.5 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very low
Hydrologic group: A
Ecological site name: Limy Upland 7–10" p.z. Deep
Ecological site number: R040XB208AZ
Present vegetation: creosotebush, paloverde, whitethorn, triangle bursage, range ratany, barrel cactus, saguaro
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 800 feet south and 1,800 feet east of the northwest corner of Section 14, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 11.00" north, 111° 17' 40.00" west

A—0 to 3 inches (0 to 8 cm); light brown (7.5YR 6/3) gravelly sandy loam, brown (7.5YR 4/4), moist; 11 percent clay; weak thick platy parting to weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine tubular and interstitial pores; few continuous distinct carbonate coats on bottom surfaces of rock fragments; 20 percent gravel; violently effervescent, 7 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; clear smooth boundary.

Bw—3 to 10 inches (8 to 25 cm); light brown (7.5YR 6/3) very gravelly sandy loam, brown (7.5YR 4/4), moist; 11 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine interstitial and tubular pores; few continuous distinct carbonate coats on faces of peds and rock fragments; 40 percent gravel; violently effervescent, 10 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bk1—10 to 27 inches (25 to 69 cm); light brown (7.5YR 6/3) extremely gravelly sandy loam, brown (7.5YR 4/4), moist; 11 percent clay; massive; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; common continuous distinct carbonate coats on faces of peds and rock fragments; 65 percent gravel; violently effervescent, 18 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bk2—27 to 48 inches (69 to 122 cm); pinkish gray (7.5YR 7/2) extremely gravelly sandy loam, brown (7.5YR 5/3), moist; 8 percent clay; single grain; loose, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; common continuous distinct carbonate coats on rock fragments; 65 percent gravel; violently effervescent, 10 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bk3—48 to 60 inches (122 to 152 cm); pinkish gray (7.5YR 7/2) extremely gravelly coarse sand, light brown (7.5YR 6/3), moist; 3 percent clay; massive; very hard, extremely firm, weakly cemented to moderately cemented; nonsticky and nonplastic; common very fine roots; many very fine interstitial and tubular pores; common

continuous distinct carbonate coats on rock fragments; 70 percent gravel; violently effervescent, 12 percent calcium carbonate equivalent; moderately alkaline, pH 8.2.

Range in Characteristics

Rock fragments: 20 to 70 percent, averages more than 35 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 5 to 15 percent

Calcium carbonate equivalent: 5 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 6 dry, 4 moist

Chroma: 3 or 4, dry or moist

Texture: fine sandy loam, sandy loam

Bw horizon

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 4 moist

Chroma: 3 or 4, dry or moist

Texture: fine sandy loam, sandy loam

Bk horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 2 to 4 dry, 3 or 4 moist

Texture: fine sandy loam, sandy loam, coarse sandy loam, coarse sand

26—Dateland loam, 0 to 2 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,500 to 1,880 feet (457 to 573 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Dateland and similar soils: 90 percent

Minor components: Brios, Denure, Gilman, Central Arizona Project Canal

Soil Properties and Qualities

Dateland soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic

Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

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lichen: 0 percent
moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 90 percent (cotton field)
woody debris: 5 percent
bare soil: 5 percent
rock fragments: 0 percent
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Available water capacity total inches: 8.5 (high)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: low
Hydrologic group: B
Ecological site name: Limy Fan 7–10" p.z.
Ecological site number: R040XB207AZ
Present vegetation: creosotebush, ratany, triangle bursage, white bursage, Indianwheat
Land capability (irrigated): 2w
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 1,800 feet south and 2,300 feet west of the northeast corner of Section 12, Township 4 S, Range 10 E

Geographic Coordinate System:
33° 6' 10.00" north, 111° 16' 0.00" west

Ap1—0 to 6 inches (0 to 15 cm); brown (7.5YR 5/4) loam, brown (7.5YR 4/3), moist; 10 percent clay; moderate coarse cloddy structure; soft, very friable, slightly sticky and slightly plastic; few fine irregular pores; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Ap2—6 to 17 inches (15 to 43 cm); brown (7.5YR 4/4) loam, brown (7.5YR 4/3), moist; 12 percent clay; moderate medium and coarse cloddy structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine and fine roots; few fine irregular pores; violently effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bk1—17 to 32 inches (43 to 81 cm); brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4), moist; 16 percent clay; weak medium and coarse subangular blocky parting to massive structure; soft, very friable, moderately sticky and moderately plastic; few very fine, medium and coarse roots; few fine irregular pores; few distinct carbonate coats on rock fragments; common fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bk2—32 to 60 inches (81 to 152 cm); brown (7.5YR 5/4) fine sandy loam, brown (7.5YR 4/4), moist; 14 percent clay; massive; soft, very friable, slightly sticky and slightly plastic; few very fine, fine, and coarse roots; few fine irregular and tubular pores; few distinct carbonate coats on rock fragments; few very fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 10 to 20 percent
Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 10YR, 7.5YR
Value: 5 or 4 dry, 4 or 5 moist
Chroma: 3 or 4, dry or moist
Texture: loam, fine sandy loam, sandy loam

B horizon

Hue: 10YR, 7.5YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 3 or 4, dry or moist
Texture: very fine sandy loam, fine sandy loam, loam, sandy loam

27—Delnorte-Nahda complex, 3 to 20 percent slopes

Map Unit Setting

Landform(s): fan terraces
Elevation: 2,500 to 3,400 feet (762 to 1,036 meters)
Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)
Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)
Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)
Frost-free period: 220 to 280 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Delnorte and similar soils: 50 percent
Nahda and similar soils: 40 percent

Minor components: Topawa, Queencreek, Riverwash, Stagecoach, Nahda soils that have less than 35 percent rock fragments, Nahda soils that have pans above 20 inches

Soil Properties and Qualities

Delnorte soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 8 to 20 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

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Physical cover
canopy plant cover: 30 percent
woody debris: 5 percent
bare soil: 10 percent
rock fragments
gravel: 75 percent
cobble: 20 percent
Depth to restrictive feature(s): 7 to 20 inches to petrocalcic
Drainage class: somewhat excessively drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 0.6 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: high
Hydrologic group: D
Ecological site name: Limy Upland 10–13" p.z.
Ecological site number: R040XA111AZ
Present vegetation: creosotebush, pricklypear and cholla, paloverde, annual grasses, ratany, hedgehog cactus, barrel cactus, ocotillo, saguaro
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hayden; about 1,775 feet east and 550 feet north from the southwest corner of Section 6, Township 5 S, Range 15 E
Geographic Coordinate System:
33° 1' 14.27" north, 110° 51' 17.60" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/4) very gravelly sandy loam, dark brown (7.5YR 3/3), moist; 10 percent clay; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 40 percent gravel; violently effervescent, 15 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk—2 to 12 inches (5 to 30 cm); light brown (7.5YR 6/3) very gravelly sandy loam, brown (7.5YR 5/3), moist; 12 percent clay; moderate fine and medium subangular blocky structure; soft, friable, nonsticky and nonplastic; common very fine roots and few medium roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate masses; 40 percent gravel and 10 percent cobble; violently effervescent, 13 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bkm—12 to 60 inches (30 to 152 cm); extremely hard; violently effervescent; cemented material, thin laminar cap; indurated; petrocalcic.

Range in Characteristics

Rock fragments: 35 to 60 percent
Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR
Value: 4 to 6 dry, 3 or 4 moist
Chroma: 3 or 4, dry or moist

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Texture: sandy loam, fine sandy loam

Bk horizon

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

Calcium carbonate equivalent: 5 to 30 percent

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 6 feet; continuous

Nahda soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic Argic

Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 3 to 10 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 30 percent

woody debris: 5 percent

bare soil: 10 percent

rock fragments

gravel: 70 percent

cobble: 20 percent

Depth to restrictive feature(s): 20 to 40 inches to petrocalcic

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.7 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: medium

Hydrologic group: C

Ecological site name: Clay Loam Upland 10–13" p.z.

Ecological site number: R040XA120AZ

Present vegetation: creosotebush, whitethorn, false mesquite, pricklypear and cholla, paloverde, annual grasses, ratany, Rothrock's grama, mesa threeawn, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hayden; about 1,400 feet east and 725 feet north from the Southwest corner of Section 6, Township 5 S, Range 15 E

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Geographic Coordinate System:

33° 1' 52.00" north, 110° 51' 21.50" west

A—0 to 1 inch (0 to 3 cm); strong brown (7.5YR 4/6) very gravelly clay loam, dark brown (7.5YR 3/4), moist; 29 percent clay; weak thin platy parting to moderate fine granular structure; soft, very friable, moderately sticky and moderately plastic; common very fine and few medium roots; common fine irregular pores; 35 percent gravel and 10 percent cobble; noneffervescent; neutral, pH 7.0; abrupt smooth boundary.

Bt1—1 inch to 10 inches (3 to 25 cm); dark reddish brown (5YR 3/4) extremely gravelly clay, reddish brown (5YR 4/4), moist; 50 percent clay; moderate very fine and fine, and medium subangular blocky structure; slightly hard, friable, very sticky and very plastic; many very fine and few medium roots; few very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 40 percent gravel and 20 percent cobble; noneffervescent; neutral, pH 7.2; clear smooth boundary.

Bt2—10 to 24 inches (25 to 61 cm); red (2.5YR 4/6) very gravelly clay, reddish brown (2.5YR 4/4), moist; 52 percent clay; strong medium prismatic parting to strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; many very fine roots; few very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; many distinct pressure faces; 45 percent gravel and 10 percent cobble; noneffervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

Bkm—24 to 60 inches (61 to 152 cm); extremely hard; cemented material, thin laminar; indurated; petrocalcic.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 40 to 65 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 6 dry, 3 or 4 moist

Texture: sandy loam, clay loam, loam

Bt horizons

Hue: 5YR, 2.5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 to 6 moist

Texture: clay, sandy clay, clay loam, sandy clay loam

Calcium carbonate equivalent: 0 to 10 percent

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 6 feet; continuous

28—Denied Access

This map unit is in areas where landowners refused access to their private property. These areas are the Arsarco Mined properties in the towns of Winkleman, Ray,

Hayden, and Kearney, Arizona. The owners of private property are entitled to this right. These areas were not traversed; therefore, soils information will not be provided. The National Soil Survey Handbook requires that every area on a soil map be designated with a map unit number. It also requires that every means available to the soil survey project be used to obtain access. This responsibility was carried out with the help of the Natural Resource Conservation Districts, but access was still denied.

29—Denure gravelly sandy loam, 0 to 2 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,500 to 1,600 feet (457 to 488 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Denure and similar soils: 90 percent

Minor components: Mohall, Carrizo

Soil Properties and Qualities

Denure soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 5 percent

 woody debris: 5 percent

 bare soil: 95 percent (farm field)

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 5.5 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: B

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site name: Sandy Loam Upland 7–10" p.z.

Ecological site number: R040XB218AZ

Present vegetation: big galleta, bush muhly, creosotebush, triangle bursage, white ratany, buckhorn cholla, ironwood, paloverde

Land capability (irrigated): 2s

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 1,950 feet north and 500 feet east of the southwest corner of Section 6, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 6' 33.00" north, 111° 15' 55.00" west

Ap1—0 to 4 inches (0 to 10 cm); brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 8 percent clay; weak fine cloddy structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; many very fine irregular pores; 20 percent gravel; slightly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Ap2—4 to 10 inches (10 to 25 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; weak fine cloddy structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine irregular pores; 10 percent gravel; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bw—10 to 45 inches (25 to 114 cm); strong brown (7.5YR 5/6) sandy loam, brown (7.5YR 4/4), moist; 12 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; few fine tubular pores; common patchy distinct carbonate coats on bottom surfaces of rock fragments; common fine carbonate filaments; 5 percent gravel; strongly effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk—45 to 60 inches (114 to 152 cm); light brown (7.5YR 6/4) extremely gravelly sandy loam, brown (7.5YR 5/4), moist; 10 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many fine irregular pores; many continuous distinct carbonate coats on rock fragments; 65 percent gravel; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 15 percent

Calcium carbonate equivalent: 2 to 5 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4 dry or moist

Rock fragments: 0 to 20 percent

B horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 4 to 6, dry or moist

Texture: sandy loam, fine sandy loam, coarse sandy loam

Rock fragments: 5 to 65 percent, averages less than 35 percent

30—Denure sandy loam, 0 to 2 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,440 to 1,600 feet (440 to 488 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Denure and similar soils: 85 percent

Minor components: Coolidge, Dateland, Momoli

Soil Properties and Qualities

Denure soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 5 percent

 woody debris: 5 percent

 bare soil: 90 percent (fallow farm field)

rock fragments

 gravel: 10 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 6.3 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: B

Ecological site name: Limy Fan 7-10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: creosotebush, big galleta, bush muhly, triangle bursage, white ratany

Land capability (irrigated): 2s

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 1,000 feet south and 250 feet west of the northeast corner of Section 12, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 6' 0.00" north, 111° 17' 0.00" west

Ap—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/3), moist; 6 percent clay; weak fine and medium cloddy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; few fine irregular pores; 10 percent gravel; violently effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bw—3 to 11 inches (8 to 28 cm); brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/4), moist; 8 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; common very fine irregular pores; 10 percent gravel; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk1—11 to 48 inches (28 to 122 cm); brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/4), moist; 8 percent clay; weak fine subangular blocky structure; hard, firm, nonsticky and slightly plastic; common very fine and fine and few medium roots; common very fine irregular pores; common continuous distinct carbonate coats on bottom surfaces of rock fragments; 8 percent gravel; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—48 to 60 inches (122 to 152 cm); brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 3/4), moist; 6 percent clay; massive; slightly hard, friable, nonsticky and nonplastic; common very fine roots; many very fine irregular pores; many continuous distinct carbonate coats on rock fragments; 20 percent gravel; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 0 to 20 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 5 to 15 percent

Calcium carbonate equivalent: 2 to 5 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

B horizons

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, fine sandy loam

31—Denure sandy loam, 1 to 3 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,440 to 2,000 feet (438 to 610 meters)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40–Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Denure and similar soils: 80 percent

Minor components: Mohall, Dateland, Laveen, Central Arizona Project Canal

Soil Properties and Qualities

Denure soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 25 percent

rock fragments

 gravel: 20 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 7.0 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: B

Ecological site name: Sandy Loam Upland 7–10" p.z.

Ecological site number: R040XB218AZ

Present vegetation: creosotebush, annual grasses

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Magma; about 1,000 feet south and 1,200 feet west of the northeast corner of Section 15, Township 3 S, Range 9 E

Geographic Coordinate System:

33° 10' 18.00" north, 111° 25' 18.00" west

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 11 percent clay; weak medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine interstitial pores; noneffervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bw—2 to 14 inches (5 to 36 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 10 percent clay; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine interstitial pores; noneffervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bk1—14 to 29 inches (36 to 74 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 11 percent clay; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; common fine tubular pores; common fine carbonate filaments; strongly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—29 to 51 inches (74 to 130 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 11 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common fine tubular pores; few fine carbonate filaments; 10 percent gravel; strongly effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

2Btkb—51 to 60 inches (130 to 152 cm); brown (7.5YR 5/4) loam, brown (7.5YR 4/3), moist; 15 percent clay; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common fine tubular pores; very few continuous faint clay films on faces of peds; many fine and medium carbonate filaments; 5 percent gravel; strongly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 0 to 20 percent gravel

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 15 percent

Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy loam, fine sandy loam

Bw horizon

Hue: 7.5YR

Value: 5 or 6 dry, 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy loam, fine sandy loam

Bk horizon

Hue: 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 to 6 dry, 3 or 4 moist

Texture: sandy loam, fine sandy loam, loam

Some areas do not contain buried Bt or Btk horizons at depths greater than 40 inches.

32—Denure-Dateland complex, 0 to 3 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,310 to 2,000 feet (400 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Denure and similar soils: 60 percent

Dateland and similar soils: 40 percent

Minor components: Central Arizona Project Canal, Mohall, Tremant, Coolidge,
Laveen

Soil Properties and Qualities

Denure soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic
Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 45 percent

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per
second)

Available water capacity total inches: 6.9 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: B

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Present vegetation: creosotebush, buckhorn cholla, ironwood, jumping cholla, mesquite, triangle bursage

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 1,800 feet north and 200 feet west of the southeast corner of Section 9, Township 3 S, Range 10 E

Geographic Coordinate System:

33° 10' 59.00" north, 111° 20' 13.00" west

A—0 to 2 inches (0 to 5 cm); light brown (7.5YR 6/3) sandy loam, brown (7.5YR 4/3), moist; 8 percent clay; moderate thin platy structure; soft, very friable, nonsticky and nonplastic; many fine roots; common fine irregular pores; 10 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bw—2 to 54 inches (5 to 137 cm); light brown (7.5YR 6/4) sandy loam, brown (7.5YR 5/4), moist; 12 percent clay; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine roots; few fine irregular pores; 10 percent gravel; slightly effervescent; slightly alkaline, pH 7.6; clear smooth boundary.

Bk—54 to 60 inches (137 to 152 cm); light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 4/4), moist; 28 percent clay; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine irregular pores; few distinct carbonate coats on rock fragments; 10 percent gravel; violently effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Rock fragments: 5 to 30 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 4 or 5 moist

Chroma: 3 to 6, dry or moist

Bw horizon

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 3 to 6, dry or moist

Bk horizon

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 4 or 5 moist

Chroma: 3 to 6, dry or moist

Texture: sandy loam, fine sandy loam, sandy clay loam

Dateland soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 0 to 3 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 50 percent

woody debris: 5 percent

bare soil: 45 percent

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 6.6 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: B

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: creosotebush, ratany, white bursage, Indianwheat, triangle bursage

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 1,300 feet south and 1,800 feet west of the northeast corner of Section 8, Township 3 S, Range 10 E

Geographic Coordinate System:

33° 11' 15.00" north, 111° 20' 35.00" west

A—0 to 3 inches (0 to 8 cm); yellowish brown (10YR 5/4) fine sandy loam, dark yellowish brown (10YR 4/4), moist; 7 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common fine irregular pores; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bw—2 to 17 inches (8 to 43 cm); yellowish brown (10YR 5/4) very fine sandy loam, dark yellowish brown (10YR 4/4), moist; 10 percent clay; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine tubular pores; 5 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bk1—17 to 46 inches (43 to 117 cm); yellowish brown (10YR 5/4) very fine sandy loam, dark yellowish brown (10YR 4/4), moist; 12 percent clay; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; many fine tubular pores; common distinct carbonate filaments; strongly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—46 to 60 inches (117 to 152 cm); yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4), moist; 15 percent clay; moderate medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic;

many fine and medium tubular pores; many distinct carbonate filaments; strongly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 0 to 30 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 4 to 6 moist

Chroma: 3 to 6, dry or moist

Texture: fine sandy loam, loam, very fine sandy loam

B horizons

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 3 to 6, dry or moist

Texture: very fine sandy loam, loam

Some pedons may have coarser textures below 40 inches.

33—Denure-Mohall complex, 1 to 5 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,550 to 2,000 feet (473 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Denure and similar soils: 50 percent

Mohall and similar soils: 40 percent

Minor components: Contine, Riverwash, Brios, soils that have calcic horizons below 40 inches, Mohall soils that have less than 15 percent calcium carbonate, Central Arizona Project Canal

Soil Properties and Qualities

Denure soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 20 percent
woody debris: 5 percent
bare soil: 55 percent
rock fragments
gravel: 20 percent
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Available water capacity total inches: 6.1 (moderate)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very low
Hydrologic group: B
Ecological site name: Sandy Loam Upland 7–10" p.z.
Ecological site number: R040XB218AZ
Present vegetation: jumping cholla, creosotebush, mesquite, triangle bursage, annual grasses, ironwood
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 2,600 feet north and 600 feet east of the southwest corner of Section 32, Township 2 S, Range 10 E
Geographic Coordinate System:
33° 8' 50.00" north, 111° 22' 17.00" west

A—0 to 2 inches (0 to 5 cm); light yellowish brown (10YR 6/4) sandy loam, brown (10YR 4/3), moist; 9 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few fine vesicular pores; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bw1—2 to 15 inches (5 to 38 cm); yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 4/4), moist; 9 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many fine tubular pores; 5 percent gravel; noneffervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bw2—15 to 37 inches (38 to 94 cm); yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 4/4), moist; 11 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; few fine tubular pores; 10 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk—37 to 60 inches (94 to 152 cm); light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4), moist; 11 percent clay; massive; soft, very friable, nonsticky and nonplastic; few medium roots; many fine interstitial pores; common patchy carbonate coats on rock fragments; 20 percent gravel; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 5 to 18 percent

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A horizon

Hue: 7.5YR, 10YR
Value: 5 or 6 dry, 4 moist
Chroma: 4 to 6 dry, 4 or 3 moist
Texture: sandy loam, fine sandy loam

Bw horizons

Hue: 7.5YR, 10YR
Value: 5 dry, 4 or 5 moist
Chroma: 4 to 6 dry, 4 moist
Texture: sandy loam, fine sandy loam
Rock fragments: 0 to 10 percent
Calcium carbonate equivalent: 0 to 3 percent

Bk horizon

Hue: 7.5YR, 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 4 to 6 dry, 4 moist
Texture: sandy loam, fine sandy loam
Rock fragments: 0 to 25 percent
Calcium carbonate equivalent: 1 to 4 percent

Mohall soils

Taxonomic classification: Fine-loamy, mixed, superactive, hyperthermic Typic Calciargids

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 10 percent

bare soil: 65 percent

rock fragments

gravel: 5 percent

Drainage class: well drained

Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)

Available water capacity total inches: 7.7 (high)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: low

Hydrologic group: B

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: jumping cholla, mesquite, creosotebush, triangle bursage, annual grasses, ironwood

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 2,300 feet north and 400 feet east of the southwest corner of Section 32, Township 2 S, Range 10 E

Geographic Coordinate System:

33° 8' 49.00" north, 111° 22' 23.00" west

A—0 to 2 inches (0 to 5 cm); light brown (7.5YR 6/4) sandy loam, brown (7.5YR 4/3), moist; 15 percent clay; moderate thin platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many fine vesicular pores; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—2 to 15 inches (5 to 38 cm); reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4), moist; 26 percent clay; strong fine and medium angular blocky structure; slightly hard, friable, slightly sticky and moderately plastic; common very fine roots; common fine tubular pores; many continuous prominent clay films on faces of peds; noneffervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Btk1—15 to 27 inches (38 to 69 cm); reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4), moist; 26 percent clay; strong fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and moderately plastic; few medium and coarse roots; common fine tubular pores; many continuous prominent clay films on faces of peds; few fine carbonate filaments; violently effervescent, 14 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Btk2—27 to 51 inches (69 to 130 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 18 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; few medium roots; common fine tubular pores; common continuous distinct clay films on faces of peds; common fine carbonate filaments; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bk—51 to 60 inches (130 to 152 cm); brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 14 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; few medium roots; common fine tubular pores; many continuous distinct carbonate coats on rock fragments; common fine carbonate filaments; 20 percent gravel; violently effervescent, 8 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 moist

Chroma: 4 to 6 dry, 4 or 3 moist

Texture: sandy loam, fine sandy loam, loam

Bt horizon

Hue: 5YR, 7.5YR

Value: 4 or 5 dry, 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy clay loam, clay loam, loam

Calcium carbonate equivalent: 0 to 5 percent

Btk and Bk horizon

Hue: 5YR, 7.5YR

Value: 4 to 7 dry, 4 or 5 moist

Chroma: 3 to 6, dry or moist

Texture: sandy clay loam, clay loam, loam, sandy loam

Rock fragments: 0 to 25 percent

Calcium carbonate equivalent: 5 to 30 percent

34—Denure-Momoli complex, 1 to 10 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,750 to 2,000 feet (532 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Denure and similar soils: 50 percent

Momoli and similar soils: 35 percent

Minor components: Carrizo, Tremant, Mohall

Soil Properties and Qualities

Denure soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 15 percent

 bare soil: 40 percent

rock fragments

 gravel: 15 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 6.4 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

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Runoff class: very low

Hydrologic group: B

Ecological site name: Sandy Loam Upland 7–10" p.z.

Ecological site number: R040XB218AZ

Present vegetation: triangle bursage, creosotebush, jumping cholla, mesquite, staghorn cholla, annual grasses, hedgehog cactus, saguaro, barrel cactus

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 1,600 feet north and 400 feet east of the southwest corner of Section 4, Township 3 S, Range 10 E

Geographic Coordinate System:

33° 11' 45.00" north, 111° 20' 4.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 11 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; few fine interstitial pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bw—2 to 28 inches (5 to 71 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 16 percent clay; moderate medium and coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many fine and medium tubular pores; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bk1—28 to 53 inches (71 to 135 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 16 percent clay; moderate medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine roots; many fine tubular pores; few patchy faint carbonate coats on rock fragments; common fine carbonate filaments; 7 percent gravel; strongly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—53 to 60 inches (135 to 152 cm); brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 19 percent clay; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common fine roots; few fine tubular pores; common patchy distinct carbonate coats on rock fragments; common fine carbonate filaments; 25 percent gravel; strongly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 0 to 25 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

Calcium carbonate equivalent: 0 to 4 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 4 moist

Chroma: 4, dry or moist

Texture: sandy loam

B horizons

Hue: 7.5YR

Value: 5 dry, 4 moist

Chroma: 4, dry or moist

Texture: sandy loam, fine sandy loam

Momoli soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 15 percent

 bare soil: 20 percent

rock fragments

 gravel: 30 percent

 cobble: 5 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 4.2 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: A

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: triangle bursage, creosotebush, jumping cholla, annual grasses, mesquite, staghorn cholla, hedgehog cactus, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 2,200 feet north and 600 feet east of the southwest corner of Section 4, Township 3 S, Range 10 E

Geographic Coordinate System:

33° 11' 49.00" north, 111° 20' 5.00" west

A—0 to 3 inches (0 to 8 cm); yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 4/4), moist; 9 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine interstitial pores; 5 percent gravel; noneffervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bw1—3 to 14 inches (8 to 36 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 9 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; few fine tubular pores; 10 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bw2—14 to 42 inches (36 to 107 cm); brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/4), moist; 9 percent clay; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine

and few medium roots; few fine tubular pores; 45 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk—42 to 60 inches (107 to 152 cm); yellowish brown (10YR 5/4) very gravelly loamy sand, dark yellowish brown (10YR 4/4), moist; 8 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine interstitial pores; common patchy distinct carbonate coats on rock fragments; 45 percent gravel and 5 percent cobble; strongly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 15 percent

Calcium carbonate equivalent: 0 to 4 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 dry, 4 moist

Chroma: 4 to 6 dry, 4 moist

Texture: sandy loam

Rock fragments: 0 to 10 percent

B horizons

Hue: 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 4 to 6 dry, 4 moist

Texture: sandy loam, loamy sand

Rock fragments: 10 to 60 percent

35—Ebon very gravelly loam, 1 to 8 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,700 to 1,850 feet (517 to 562 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Ebon and similar soils: 80 percent

Minor components: Suncity, Hickiwan, Contine, Beardsley, Gunsight, Mohall, Pinamt

Soil Properties and Qualities

Ebon soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, hyperthermic Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

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cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 30 percent
woody debris: 10 percent
bare soil: 40 percent
rock fragments
gravel: 20 percent
Drainage class: well drained
Ksat solum: 0.06 to 19.98 inches per hour (0.42 to 141.00 micrometers per second)
Available water capacity total inches: 4.3 (low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: medium
Hydrologic group: C
Ecological site name: Clay Loam Upland 7–10" p.z.
Ecological site number: R040XB205AZ
Present vegetation: triangle bursage, paloverde, buckhorn cholla, jojoba, saguaro, creosotebush, dollarjoint pricklypear, ironwood, annual grasses
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties on USGS Quadrangle Apache Junction; about 150 feet south and 2,200 feet west of the northeast corner of Section 2, Township 1 N, Range 7 E

Geographic Coordinate System:

33° 27' 55.00" north, 111° 36' 18.00" west

A—0 to 1 inch (0 to 3 cm); light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 4/4), moist; 21 percent clay; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; few very fine vesicular and common very fine and fine tubular pores; 45 percent gravel; noneffervescent; moderately alkaline, pH 8.2; gradual wavy boundary.

Bt—1 inch to 11 inches (3 to 28 cm); yellowish red (5YR 5/6) very gravelly clay, yellowish red (5YR 4/6), moist; 45 percent clay; weak medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine roots; few very fine and fine tubular and common very fine and fine interstitial pores; common continuous distinct clay films on faces of peds and lining pores; 35 percent gravel; noneffervescent; moderately alkaline, pH 8.2; clear wavy boundary.

Btk—11 to 24 inches (28 to 61 cm); yellowish red (5YR 5/6) very gravelly sandy clay, yellowish red (5YR 4/6), moist; 42 percent clay; moderate medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine roots; few fine interstitial and few fine tubular pores; common continuous distinct clay films on faces of peds and lining pores; common pressure faces; 40 percent gravel; strongly effervescent; moderately alkaline, pH 8.2; clear wavy boundary.

B't—24 to 43 inches (61 to 109 cm); yellowish red (5YR 5/6) very gravelly sandy clay, yellowish red (5YR 4/6), moist; 42 percent clay; moderate medium subangular blocky

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structure; hard, friable, moderately sticky and moderately plastic; common fine roots; many fine interstitial and few fine tubular pores; common continuous distinct clay films on faces of peds and lining pores; common pressure faces; 55 percent gravel; strongly effervescent; moderately alkaline, pH 8.2; clear wavy boundary.

2C—43 to 60 inches (109 to 152 cm); white (5YR 8/1) gravelly loamy sand, 50 percent brown (7.5YR 4/4) and 50 percent pinkish white (7.5YR 8/2), moist; 7 percent clay; massive; extremely hard, firm, nonsticky and nonplastic; few fine tubular pores; 25 percent gravel; violently effervescent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Range in Characteristics

Rock fragments: 25 to 85 percent, averages more than 35 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 35 to 50 percent

A horizon

Hue: 10YR, 7.5YR, 5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 2 to 6, dry or moist

Texture: loam, clay loam, sandy loam

B horizons

Hue: 7.5YR, 5YR, 2.5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 4 to 8 dry, 2 to 6 moist

Texture: clay, sandy clay, clay loam, sandy clay loam

Calcium carbonate equivalent: 0 to 5 percent

C horizon

Hue: 7.5YR, 5YR

Value: 4 to 8 dry, 2 to 4 moist

Chroma: 1 to 4, dry or moist

Texture: loamy sand, sandy loam

Calcium carbonate equivalent: 0 to 5 percent

Can be weakly cemented and have more than 20 percent calcium carbonate equivalent in some pedons

36—Ebon-Carrizo family complex, 0 to 10 percent slopes

Map Unit Setting

Landform(s): Ebon – fan terraces; Carrizo family – flood plains

Elevation: 1,650 to 2,290 feet (502 to 699 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Ebon and similar soils: 75 percent

Carrizo family and similar soils: 15 percent

Minor components: Beardsley, Hickiwan, Mohall

Soil Properties and Qualities

Ebon soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, hyperthermic Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 5 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 45 percent

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

Available water capacity total inches: 4.8 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: medium

Hydrologic group: C

Ecological site name: Clay Loam Upland 7–10" p.z.

Ecological site number: R040XB205AZ

Present vegetation: triangle bursage, paloverde, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 2,150 feet north and 1,100 feet west of the southeast corner of Section 25, Township 2 S, Range 10 E

Geographic Coordinate System:

33° 13' 28.10" north, 111° 15' 48.31" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4), moist; 18 percent clay; weak thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; few very fine interstitial pores; 20 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

BA—3 to 13 inches (8 to 33 cm); reddish brown (5YR 4/4) cobbly clay loam, yellowish red (5YR 4/6), moist; 33 percent clay; moderate fine subangular blocky structure; hard, friable, moderately sticky and moderately plastic; common fine roots; few fine tubular pores; 15 percent gravel and 15 percent cobble; noneffervescent; moderately alkaline, pH 8.0; clear wavy boundary.

Bt—13 to 23 inches (33 to 59 cm); yellowish red (5YR 4/6) very gravelly clay,(5YR 4/8), moist; 50 percent clay; moderate medium subangular blocky structure; very

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hard, firm, moderately sticky and moderately plastic; common very fine roots; few fine tubular pores; common continuous distinct clay films on faces of peds; few pressure faces; 35 percent gravel and 20 percent cobble; noneffervescent; moderately alkaline, pH 8.0; clear wavy boundary.

Btk—23 to 40 inches (59 to 102 cm); reddish brown (5YR 5/4) very gravelly clay,(5YR 4/8), moist; 50 percent clay; weak fine subangular blocky structure; hard, friable, moderately sticky and moderately plastic; common fine roots; few fine tubular pores; common continuous distinct clay films on faces of peds; few fine carbonate masses; 35 percent gravel and 20 percent cobble; slightly effervescent; moderately alkaline, pH 8.0; clear wavy boundary.

Bck—40 to 60 inches (102 to 152 cm); light reddish brown (5YR 6/4) extremely cobbly sandy clay loam, yellowish red (5YR 4/6), moist; 27 percent clay; massive; hard, friable, moderately sticky and moderately plastic; few very fine roots; few fine tubular pores; few fine carbonate masses; 30 percent gravel and 35 percent cobble; strongly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 20 to 65 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 10YR, 7.5YR, 5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 2 to 6, dry or moist

Texture: loam, clay loam

BA and Bt horizon

Hue: 7.5YR, 5YR, 2.5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 2 to 8, dry or moist

Texture: loam, clay loam

Btk and Bck horizon

Hue: 7.5YR, 5YR, 2.5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 4 to 8, dry or moist

Texture: clay, clay loam, sandy clay loam

Calcium carbonate equivalent: 2 to 15 percent

Carrizo family soils

Taxonomic classification: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

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Physical cover

canopy plant cover: 50 percent

woody debris: 10 percent

bare soil: 40 percent

rock fragments: 0 percent

Drainage class: excessively drained

Ksat solum: 5.95 to 39.69 inches per hour (42.00 to 280.00 micrometers per second)

Available water capacity total inches: 1.7 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: occasional

Runoff class: very low

Hydrologic group: A

Ecological site name: Sandy Wash 7–10" p.z.

Ecological site number: R040XB216AZ

Present vegetation: ironwood, paloverde, mesquite

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 2,300 feet south and 1,800 feet west of the northeast corner of Section 25, Township 2 S, Range 10 E

Geographic Coordinate System:

33° 13' 31.38" north, 111° 15' 46.36" west

C1—0 to 10 inches (0 to 25 cm); very pale brown (10YR 7/3) very gravelly sand, light brownish gray (10YR 6/2), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and few fine roots; common fine interstitial pores; 58 percent gravel; noneffervescent; moderately alkaline, pH 8.0; clear smooth boundary.

C2—10 to 20 inches (25 to 51 cm); light brownish gray (10YR 6/2) extremely gravelly coarse sand, grayish brown (10YR 5/2), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; few very fine roots; common fine interstitial pores; 66 percent gravel; noneffervescent; moderately alkaline, pH 8.2; clear smooth boundary.

C3—20 to 60 inches (51 to 152 cm); light brownish gray (10YR 6/2) very gravelly coarse sand, grayish brown (10YR 5/2), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; few very fine coarse roots; common fine interstitial pores; 55 percent gravel; slightly effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Rock fragments: 5 to 75 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 0 to 5 percent

C horizons

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 2 to 6 moist

Chroma: 2 to 6 dry, 2 to 4 moist

Texture: sand, coarse sand

37—Eskiminzin-Rock outcrop complex, 35 to 75 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 2,790 to 4,400 feet (850 to 1,341 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Eskiminzin and similar soils: 55 percent

Rock outcrop: 30 percent

Minor components: Soils deeper than 20 inches, soils that contain 35 percent clay and less than 35 percent rock fragments

Soil Properties and Qualities

Eskiminzin soils

Taxonomic classification: Clayey-skeletal, smectitic, thermic Lithic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from basalt

Slope: 35 to 75 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 25 percent

 cobble: 20 percent

 stone: 10 percent

Depth to restrictive feature(s): 6 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.0 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 12–16" p.z. Clayey

Ecological site number: R041XC330AZ

Present vegetation: annual forbs, annual grasses, shrubby buckwheat, paloverde, curly mesquite, snakeweed, sideoats grama, juniper, catclaw acacia, mesquite, banana yucca, buckhorn cholla

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of the San Carlos Indian Reservation, AZ, Parts of Gila and Graham Counties; USGS Quadrangle Saddle Mountain; about 1,200 feet west and 1,400 feet south of the northeast corner of Section 23, Township 5 S, Range 16 E

Geographic Coordinate System:

32° 58' 43.87" north, 110° 41' 13.27" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 4/3) very cobbly clay loam, dark brown (7.5YR 3/3), moist; 35 percent clay; strong fine and medium granular structure; slightly hard, very friable, very sticky and very plastic; common very fine and fine roots; many very fine and fine irregular pores; 15 percent gravel and 35 percent cobble; noneffervescent; neutral, pH 7.2; clear wavy boundary.

Bt—1 inch to 14 inches (3 to 36 cm); brown (7.5YR 4/4) very cobbly clay, brown (7.5YR 4/4), moist; 55 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine and few medium roots; common very fine tubular and irregular pores; many continuous distinct clay films on faces of peds and rock fragments; 15 percent gravel and 35 percent cobble; noneffervescent; slightly alkaline, pH 7.4; clear wavy boundary.

R—14 to 60 inches (36 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 35 to 55 percent

A horizon

Hue: 7.5YR, 10YR

Value: 3 to 5 dry, 2 to 4 moist

Chroma: 2 or 3 dry or moist

Texture: loam, silty clay loam, clay loam, clay

Bt horizons

Hue: 5YR, 7.5YR

Value: 3 to 5 dry, 2 to 4 moist

Chroma: 2 to 4 dry or moist

Texture: clay loam, clay

Calcium carbonate equivalent: 0 to 5 percent

R horizon

Basalt bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of

basalt and some andesite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

38—Eskiminzin-Rock outcrop-Sontag complex, tuff, 5 to 45 percent slopes

Map Unit Setting

Landform(s): hills

Elevation: 3,400 to 4,400 feet (1,036 to 1,341 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Eskiminzin, tuff and similar soils: 35 percent

Rock outcrop: 30 percent

Sontag and similar soils: 20 percent

Minor components: Lampshire, Riverwash, Pantak, Mabray, very deep soils that contain more than 35 percent clay and rock fragments, soils that are clayey-skeletal and very deep

Soil Properties and Qualities

Eskiminzin, tuff soils

Taxonomic classification: Clayey-skeletal, smectitic, thermic Lithic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from welded tuff

Slope: 5 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 30 percent

 cobble: 20 percent

 stone: 10 percent

Depth to restrictive feature(s): 7 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.00 to 0.57 inches per hour (0.01 to 4.00 micrometers per second)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)
Available water capacity total inches: 1.1 (very low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: very high
Hydrologic group: D
Ecological site name: Volcanic Hills 12–16" p.z. Clayey
Ecological site number: R041XC330AZ
Present vegetation: annual grasses, shrubby buckwheat, curly mesquite, sideoats grama, snakeweed, catclaw acacia, mesquite, pricklypear and cholla, sacahuista, oneseed juniper, banana yucca
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Booger Canyon; about 1,400 feet east and 1,000 feet south of the northwest corner of Section 2, Township 6 S, Range 18 E

Geographic Coordinate System:

32° 56' 47.00" north, 110° 28' 42.00" west

A—0 to 4 inches (0 to 10 cm); brown (10YR 4/3) very gravelly sandy clay loam, very dark grayish brown (10YR 3/2), moist; 21 percent clay; moderate fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common fine roots; common fine tubular pores; 40 percent gravel; noneffervescent; slightly alkaline, pH 7.4; abrupt wavy boundary.

Bt—4 to 14 inches (10 to 36 cm); brown (10YR 4/3) very gravelly clay, very dark grayish brown (10YR 3/2), moist; 40 percent clay; strong fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; few fine tubular pores; common continuous distinct clay films on faces of pedes and rock fragments; 40 percent gravel and 10 percent cobble; noneffervescent; neutral, pH 7.0; abrupt wavy boundary.

R—14 to 60 inches (36 to 152 cm); unweathered tuff bedrock.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 35 to 55 percent

A horizon

Hue: 10YR, 7.5YR

Value: 3 to 5 dry, 2 to 4 moist

Chroma: 3 or 4 dry, 2 or 3 moist

Texture: loam, sandy clay loam, clay loam, sandy loam

Bt horizon

Hue: 10YR, 7.5YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 to 4 dry, 2 or 3 moist

Texture: clay loam, clay

R horizon

Tuff bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and shelves of welded tuff and volcanic breccia. Rock outcrop also includes areas where the depth to bedrock is less than four inches.

Sontag soils

Taxonomic classification: Fine, smectitic, thermic Ustertic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from welded tuff

Slope: 5 to 25 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 70 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 25 percent

 cobble: 20 percent

Drainage class: well drained

Ksat solum: 0.00 to 0.57 inches per hour (0.01 to 4.00 micrometers per second)

Available water capacity total inches: 8.7 (high)

Shrink-swell potential: about 10.0 LEP (very high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Clayey Slopes 12–16" p.z.

Ecological site number: R041XC303AZ

Present vegetation: little barley, curly mesquite, mesquite, oneseed juniper, sacahuista, threeawn, sideoats grama, catclaw acacia, pricklypear and cholla, yerba de pasmo

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Booger Canyon; about 500 feet east and 100 feet south of the northwest corner of Section 2, Township 6 S, Range 18 E

Geographic Coordinate System:

32° 56' 52.00" north, 110° 28' 53.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/2) sandy clay loam, very dark brown (7.5YR 2.5/3), moist; 33 percent clay; moderate fine and medium granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; few fine irregular pores; common distinct organic stains on faces of peds; 10 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt1—2 to 21 inches (5 to 53 cm); dark brown (7.5YR 3/3) clay, very dark brown (7.5YR 2.5/3), moist; 55 percent clay; strong medium wedge parting to strong fine

and medium angular blocky structure; hard, firm, very sticky and very plastic; common fine and few medium roots; common fine tubular pores; common continuous distinct clay films on faces of pedis; common pressure faces; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.4; clear smooth boundary.

Bt₂—21 to 39 inches (53 to 99 cm); dark brown (7.5YR 3/3) clay, very dark brown (7.5YR 2.5/3), moist; 51 percent clay; moderate medium wedge parting to strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; common fine and medium roots; common fine tubular pores; common continuous distinct clay films on faces of pedis; common pressure faces; 10 percent gravel; slightly effervescent; slightly alkaline, pH 7.4; clear smooth boundary.

Btk—39 to 48 inches (99 to 122 cm); dark brown (7.5YR 3/3) gravelly clay, very dark brown (7.5YR 2.5/3), moist; 53 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; common fine roots; common fine tubular pores; common continuous distinct clay films on faces of pedis and rock fragments; few continuous distinct carbonate coats on rock fragments; 20 percent gravel and 5 percent cobble; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bt'—48 to 60 inches (122 to 152 cm); dark brown (7.5YR 3/3) clay, very dark brown (7.5YR 2.5/3), moist; 45 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; few fine roots; common fine tubular pores; common continuous distinct clay films on faces of pedis and rock fragments; 10 percent gravel; slightly effervescent; slightly alkaline, pH 7.6.

Range in Characteristics

Soil cracks: many vertical cracks 0.5 inch to 2 inches wide from the surface to a depth of 30 inches or more

Rock fragments: 0 to 25 percent

Reaction: 6.6 to 8.4 (neutral to moderately alkaline)

Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 10YR, 7.5YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 or 3 dry, 1 to 3 moist

Texture: loam, sandy clay loam, clay loam

Bt and Btk horizons

Hue: 10YR, 7.5YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 or 3 dry, 1 to 3 moist

Texture: clay loam, clay

39—Eskiminzin-Sontag-Rock outcrop complex, 2 to 45 percent slopes

Map Unit Setting

Landform(s): hills, lava flows, mountains

Elevation: 3,400 to 4,400 feet (1,036 to 1,341 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41–Southeastern Arizona Basin and Range

Land Resource Unit: 41–3 Southern Arizona Semidesert Grassland

Map Unit Composition

Eskiminzin and similar soils: 40 percent

Sontag and similar soils: 30 percent

Rock outcrop: 20 percent

Minor components: Pantak, Riverwash, soils that are very deep and contain more than 35 percent clay and rock fragments

Soil Properties and Qualities

Eskiminzin soils

Taxonomic classification: Clayey-skeletal, smectitic, thermic Lithic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from basalt

Slope: 10 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 20 percent

 cobble: 30 percent

 stone: 15 percent

Depth to restrictive feature(s): 5 to 12 inches to bedrock, paralithic; 8 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.00 to 1.98 inches per hour (0.01 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.6 (very low)

Shrink-swell potential: about 5.0 LEP (moderate)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 12–16" p.z. Clayey

Ecological site number: R041XC330AZ

Present vegetation: catclaw acacia, shrubby buckwheat, curly mesquite, sideoats grama, paloverde, buckhorn cholla, ocotillo, cane bluestem, jojoba

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of the San Carlos Indian Reservation, AZ, Parts of Gila and Graham Counties; USGS Quadrangle Saddle Mountain; about 600 feet east and 1,000 feet north of the southwest corner of Section 29, Township 5 S, Range 17 E

Geographic Coordinate System:

32° 58' 8.00" north, 110° 37' 52.54" west

A—0 to 3 inches (0 to 7 cm); dark brown (7.5YR 3/3) extremely cobbly loam, dark brown (7.5YR 3/2), moist; 23 percent clay; strong fine, medium and coarse granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine irregular pores; 35 percent gravel and 30 percent cobble and 5 percent stone; slightly effervescent; slightly alkaline, pH 7.8; clear wavy boundary.

Bt—3 to 9 inches (7 to 23 cm); brown (7.5YR 4/3) very gravelly clay, dark brown (7.5YR 3/3), moist; 55 percent clay; strong medium and coarse angular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular and irregular pores; common distinct clay films on faces of peds and rock fragments; many pressure faces; 35 percent gravel and 10 percent cobble; noneffervescent; neutral, pH 7.2; clear wavy boundary.

Crt—9 to 11 inches (23 to 28 cm); few continuous distinct clay films on bedrock; clear wavy boundary.

R—11 to 60 inches (28 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Rock fragments: 35 to 75 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 35 to 55 percent

A horizon

Hue: 7.5YR, 2.5YR

Value: 3 to 5 dry, 2 to 4 moist

Chroma: 2 to 4 dry or moist

Texture: loam, silty clay loam, clay loam, clay

Bt horizon

Hue: 5YR, 7.5YR, 2.5YR

Value: 3 to 5 dry, 2 to 3 moist

Chroma: 2 to 4 dry or moist

Texture: clay loam, clay

Calcium carbonate equivalent: 0 to 5 percent

Crt and R horizons

Basalt bedrock

Sontag soils

Taxonomic classification: Fine, smectitic, thermic Ustertic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from basalt

Slope: 2 to 30 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 40 percent
woody debris: 5 percent
bare soil: 20 percent
rock fragments
gravel: 30 percent
cobble: 5 percent
stone: 1 percent
Depth to restrictive feature(s): 45 to 60 inches to bedrock, lithic
Drainage class: well drained
Ksat solum: 0.00 to 0.06 inches per hour (0.01 to 0.42 micrometers per second)
Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)
Available water capacity total inches: 7.2 (high)
Shrink-swell potential: about 8.0 LEP (high)
Flooding hazard: none
Runoff class: very high
Hydrologic group: D
Ecological site name: Clayey Upland 12–16" p.z.
Ecological site number: R041XC304AZ
Present vegetation: curly mesquite, mesquite, paloverde, green sprangletop, Arizona cottontop, spidergrass, jojoba, globemallow, buckhorn cholla
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: Typical pedon description is from the Soil Survey of the San Carlos Indian Reservation, AZ, Parts of Gila and Graham Counties; USGS Quadrangle Saddle Mountain; about 700 feet east and 1,200 feet north of the southwest corner of Section 29, Township 5 S, Range 17 E

Geographic Coordinate System:

32° 58' 16.19" north, 110° 38' 14.38" west

A—0 to 7 inches (0 to 18 cm); brown (7.5YR 4/3) clay, brown (7.5YR 4/3), moist; 52 percent clay; strong fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; many very fine and fine roots; many very fine and fine irregular pores; violently effervescent; moderately alkaline, pH 8.2; gradual wavy boundary.

Bt—7 to 48 inches (18 to 122 cm); brown (7.5YR 4/3) clay, brown (7.5YR 4/3), moist; 58 percent clay; strong medium and coarse angular blocky structure; hard, firm, very sticky and very plastic; common fine roots; many very fine tubular and irregular pores; common distinct clay films on faces of ped and rock fragments: many pressure faces; violently effervescent; strongly alkaline, pH 8.5; abrupt wavy boundary.

R—48 to 60 inches (122 to 152 cm); unweathered basalt bedrock.

Range in Characteristics

Soil cracks: many vertical cracks 0.5 inch to 2 inches wide from the surface to a depth of 30 inches or more

Rock fragments: 0 to 10 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 5YR, 7.5YR, 2.5YR
Value: 2 to 5 dry, 2 to 5 moist
Chroma: 2 to 4 dry or moist
Texture: silty clay loam, clay loam, clay

Bt horizons

Hue: 5YR, 7.5YR, 2.5YR
Value: 3 to 5 dry, 2 to 3 moist
Chroma: 2 to 4, dry or moist
Texture: clay loam, clay, silty clay
Calcium carbonate equivalent: 0 to 10 percent

R horizon

Basalt bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of basalt and some andesite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

40—Fig family-Topock complex, 5 to 50 percent slopes

Map Unit Setting

Landform(s): hills, mountains
Elevation: 2,390 to 3,190 feet (730 to 973 meters)
Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)
Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)
Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)
Frost-free period: 220 to 280 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Fig family and similar soils: 55 percent
Topock and similar soils: 35 percent
Minor components: Anklam, Hayhook, Cellar

Soil Properties and Qualities

Fig family soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic, shallow Typic Torriorthents
Geomorphic position: generally on summits and backslopes
Parent material: slope alluvium and/or residuum weathered from granite
Slope: 5 to 50 percent
Surface cover:
Biological crust
cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 50 percent
woody debris: 10 percent
bare soil: 40 percent
rock fragments
gravel: 55 percent
cobble: 3 percent
Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 1.2 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very high
Hydrologic group: C
Ecological site name: Shallow Hills 10–13" p.z.
Ecological site number: R040XA105AZ
Present vegetation: annual forbs, turpentine bush, purple threeawn, catclaw acacia, mesquite, jojoba, flattop buckwheat, bush muhly, perennial forbs, saguaro, spidergrass, agave, pricklypear and cholla
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Teapot Mountain; about 2,160 feet and 975 feet south of the northwest corner of Section 17, Township 3 S, Range 13 E

Geographic Coordinate System:

33° 10' 30.30" north, 111° 2' 35.10" west

A—0 to 2 inches (0 to 5 cm); brown (10YR 4/3) gravelly sandy loam, dark brown (10YR 3/3), moist; 18 percent clay; moderate medium platy structure parting to single grain; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial and common very fine tubular pores; 20 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

C—2 to 16 inches (5 to 41 cm); brown (10YR 4/3) very gravelly sandy loam, dark brown (10YR 3/3), moist; 18 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; common very fine interstitial pores; 40 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Cr—16 to 60 inches (41 to 152 cm); weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 10 to 60 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 7 to 18 percent

A and C horizons

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 3 or 4 moist

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loamy sand

Cr horizons

Granite and granodiorite bedrock

Fig as used in this mapping unit is at the family level. Fig series is moist in the soil moisture control section for less than 20 days cumulative between July and August.

Topock soils

Taxonomic classification: Fine, mixed, superactive, thermic Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 5 to 35 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 50 percent

woody debris: 10 percent

bare soil: 40 percent

rock fragments

gravel: 55 percent

cobble: 7 percent

stone: 3 percent

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

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)

Available water capacity total inches: 3.3 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Shallow Hills 10–13" p.z.

Ecological site number: R040XA105AZ

Present vegetation: annual forbs, turpentine bush, purple threeawn, catclaw acacia, mesquite, jojoba, flattop buckwheat, bush muhly, perennial forbs, saguaro, spidergrass, agave, pricklypear and cholla

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Teapot Mountain; about 1,585 feet east and 765 feet north of the southwest corner of Section 17, Township 3 S, Range 13 E

Geographic Coordinate System:

33° 9' 55.00" north, 111° 2' 47.80" west

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

A—0 to 2 inches (0 to 5 cm); light reddish brown (5YR 6/4) gravelly sandy loam, reddish brown (5YR 4/4), moist; 10 percent clay; weak very fine platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt smooth boundary.

Bt1—2 to 18 inches (5 to 46 cm); reddish brown (5YR 4/4) sandy clay, yellowish red (5YR 4/6), moist; 45 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine roots; many very fine tubular pores; many continuous distinct clay films on faces of ped and rock fragments; 10 percent gravel; noneffervescent; slightly acid, pH 6.2; clear smooth boundary.

Bt2—18 to 24 inches (46 to 61 cm); reddish brown (5YR 4/4) gravelly sandy clay, yellowish red (5YR 4/6), moist; 45 percent clay; strong very fine subangular blocky structure; slightly hard, firm, very sticky and very plastic; common very fine and fine roots; many very fine interstitial pores; many continuous distinct clay films on faces of ped and rock fragments; 15 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt smooth boundary.

Cr—24 to 32 inches (61 to 81 cm); weathered granite bedrock; abrupt smooth boundary.

R—32 to 60 inches (81 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Rock fragments: 10 to 35 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 5YR, 7.5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 3 to 6 moist

Texture: sandy clay loam, sandy loam

Bt horizons

Hue: 2.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 6, dry or moist

Texture: clay, sandy clay, clay loam

Cr and R horizons

Granite and granodiorite bedrock

Topock as used in this mapping unit is a taxadjunct to the series because weathered bedrock is present below 20 inches. Topock series is Clayey, mixed, superactive, thermic, shallow Typic Haplargids.

41—Gachado-Lomitas-Rock outcrop complex, 7 to 55 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 1,780 to 2,450 feet (541 to 747 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40–Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Gachado and similar soils: 45 percent

Lomitas and similar soils: 20 percent

Rock outcrop: 20 percent

Minor components: Carrizo, Cherioni, Ebon, Gunsight, Pinamt

Soil Properties and Qualities

Gachado soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic, shallow

Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from dacite

Slope: 7 to 55 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 30 percent

woody debris: 5 percent

bare soil: 65 percent

rock fragments: 0 percent

Depth to restrictive feature(s): 5 to 15 inches to bedrock, paralithic; 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)

Available water capacity total inches: 0.6 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 7–10" p.z.

Ecological site number: R040XB222AZ

Present vegetation: brittlebush, jojoba, triangle bursage, buckhorn cholla, paloverde, ironwood, creosotebush, saguaro, white ratany, annual grasses

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, AZ; USGS Quadrangle Baldy

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Mountain; about 500 feet north and 1,500 feet east of the southwest corner of
Section 29, Township 6 N, Range 1 E
Geographic Coordinate System:
33° 49' 42.0" north, 112° 17' 7.0" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/4), moist; 18 percent clay; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine interstitial pores; 38 percent gravel; noneffervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bt—2 to 8 inches (5 to 20 cm); yellowish red (5YR 4/6) very gravelly sandy clay loam, reddish brown (5YR 5/3), moist; 27 percent clay; moderate fine subangular blocky parting to moderate medium granular structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine and fine and common medium roots; common very fine and fine tubular pores; few continuous distinct clay films on faces of peds and lining pores; 54 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

Cr—8 to 15 inches (20 to 38 cm); weathered volcanic breccia bedrock; gradual wavy boundary.

R—15 to 60 inches (38 to 152 cm); unweathered volcanic breccia bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 25 to 35 percent

Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 5YR, 7.5YR

Value: 5 to 7 dry, 3 to 5 moist

Chroma: 3 to 6, dry or moist

Texture: sandy loam, loam

B horizon

Hue: 5YR, 7.5YR

Value: 4 to 7, dry or moist

Chroma: 3 to 8, dry or moist

Texture: sandy clay loam, clay loam

R horizon

Volcanic breccia, andesite, rhyolite, tuff, and dacite bedrock

Gachado as used in this mapping unit is a taxadjunct to the series because this soil contains 7 inches of weathered bedrock above the lithic contact. Gachado series is Loamy-skeletal, mixed, superactive, hyperthermic, Lithic Haplargids

Lomitas soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Lithic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from dacite

Slope: 7 to 55 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 30 percent
woody debris: 5 percent
bare soil: 65 percent
rock fragments: 0 percent
Depth to restrictive feature(s): 7 to 18 inches to bedrock, paralithic; 15 to 20 inches to bedrock, lithic
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)
Available water capacity total inches: 0.8 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: high
Hydrologic group: D
Ecological site name: Volcanic Hills 7–10" p.z.
Ecological site number: R040XB222AZ
Present vegetation: brittlebush, jojoba, triangle bursage, paloverde, ironwood, shrubby buckwheat, pricklypear and cholla, creosotebush, annual grasses
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, AZ; USGS Quadrangle Baldy Mountain; about 950 feet north and 2,600 feet west of the southeast corner of Section 29, Township 6 N, Range 1 E

Geographic Coordinate System:

33° 49' 46.0" north, 112° 16' 51.0" west

A—0 to 2 inches (0 to 5 cm); pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3), moist; 10 percent clay; weak very fine and fine granular structure; slightly hard, friable, nonsticky and nonplastic; many very fine and fine roots; many fine interstitial pores; 75 percent gravel and 10 percent cobble; strongly effervescent; moderately alkaline, pH 8.4; abrupt smooth boundary.

Bw1—2 to 6 inches (5 to 15 cm); very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 4/3), moist; 15 percent clay; weak very fine and fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many fine and common medium roots; many very fine and fine tubular pores; 40 percent gravel and 10 percent cobble; strongly effervescent; moderately alkaline, pH 8.4; clear smooth boundary.

Bw2—6 to 17 inches (15 to 43 cm); light brown (7.5YR 6/3) extremely gravelly sandy loam, brown (7.5YR 5/4), moist; 15 percent clay; weak very fine and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and common medium roots; many very fine tubular pores; 45 percent gravel and 20 percent cobble; strongly effervescent; moderately alkaline, pH 8.4; abrupt irregular boundary.

Cr—17 to 20 inches (43 to 51 cm); weathered volcanic breccia bedrock; clear smooth boundary.

R—20 to 60 inches (51 to 152 cm); unweathered volcanic breccia bedrock.

Range in Characteristics

Rock fragments: 35 to 85 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 10 to 20 percent

Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 7.5YR, 10YR

Value: 4 to 7 dry, 4 or 5 moist

Chroma: 3 to 6, dry or moist

Texture: sandy loam

B horizon

Hue: 5YR, 7.5YR

Value: 5 to 7 dry, 4 or 5 moist

Chroma: 3 to 6 dry 3 or 4 moist

Texture: sandy loam

R horizon

Volcanic breccia, andesite, rhyolite, tuff, and dacite bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of andesite, rhyolite, tuff, dacite, and volcanic breccia. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

42—Gadsden clay, 0 to 2 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,500 to 1,600 feet (457 to 488 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Gadsden and similar soils: 85 percent

Minor components: Cashion, Glenbar

Soil Properties and Qualities

Gadsden soils

Taxonomic classification: Fine, smectitic, calcareous, hyperthermic Vertic Torrifuvents

Geomorphic position: drainageways

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Parent material: mixed stream alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 95 percent (alfalfa field)

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 0.00 to 0.20 inches per hour (0.01 to 1.40 micrometers per second)

Available water capacity total inches: 9.0 (high)

Shrink-swell potential: about 10.0 LEP (very high)

Flooding hazard: occasional

Runoff class: medium

Hydrologic group: D

Ecological site name: Clayey Swale 7–10" p.z.

Ecological site number: R040XB203AZ

Present vegetation: tobosa, pricklypear and cholla, vine mesquite

Land capability (irrigated): 3w

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 200 feet south and 150 feet east of the northwest corner of Section 14, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 23.00" north, 111° 18' 4.00" west

Ap1—0 to 2 inches (0 to 5 cm); brown (10YR 5/3) clay, dark brown (10YR 3/3), moist; 43 percent clay; strong very thick platy structure; extremely hard, very firm, very sticky and very plastic; few fine roots; few very fine tubular and many fine irregular pores; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Ap2—2 to 17 inches (5 to 43 cm); grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2), moist; 49 percent clay; strong fine and medium subangular blocky structure; hard, friable, very sticky and very plastic; few very fine roots; common very fine irregular pores; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

C1—17 to 33 inches (43 to 84 cm); grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2), moist; 46 percent clay; strong fine and medium subangular blocky structure; moderately hard, friable, very sticky and very plastic; common very fine roots; common very fine irregular pores; violently effervescent; neutral, pH 7.2; clear smooth boundary.

C2—33 to 60 inches (84 to 152 cm); brown (7.5YR 5/2) clay, dark brown (7.5YR 3/2), moist; 46 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, very sticky and very plastic; common very fine roots; common very fine irregular pores; violently effervescent; neutral, pH 7.2.

Range in Characteristics

Soil cracks: 0.50 to 2.00 inches wide to a depth of 20 inches or more

Average percent clay in the control section: 40 to 55 percent

Calcium carbonate equivalent: 10 to 15 percent

A horizons

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3, dry or moist

Texture: clay, silty clay

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

C horizons

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 2 to 4, dry or moist

Texture: clay, silty clay with many very thin layers of silty clay loam, clay loam

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

43—Gila-Vinton complex, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,750 to 2,100 feet (533 to 640 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Gila and similar soils: 45 percent

Vinton and similar soils: 40 percent

15 percent farmland

85 percent woodland

Minor components: Quiburi, Queencreek, Glendale, Wetrock

Soil Properties and Qualities

Gila soils

Taxonomic classification: Coarse-loamy, mixed, superactive, calcareous, thermic

Typic Torrfluvents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

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gypsum: 0 percent
Physical cover
 canopy plant cover: 85 percent
 woody debris: 5 percent
 bare soil: 10 percent
rock fragments: 0 percent
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Available water capacity total inches: 9.6 (high)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: occasional
Runoff class: very low
Hydrologic group: B
Ecological site name: Prosopis velutina/Sporobolus wrightii
Ecological site number: F040XA124AZ
Present vegetation: mesquite, tamarisk, Arizona fescue, willow
Land capability (irrigated): 2e
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; about 1,000 feet south and 2,300 feet west of the northeast corner of Section 2, Township 5 S, Range 14 E

Geographic Coordinate System:

33° 1' 52.00" north, 110° 53' 15.00" west

C1—0 to 3 inches (0 to 8 cm); brown (10YR 5/3) very fine sandy loam, dark brown (10YR 3/3), moist; 7 percent clay; weak thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine irregular pores; strongly effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

C2—3 to 10 inches (8 to 26 cm); pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3), moist; 7 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine irregular pores; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

C3—10 to 32 inches (26 to 81 cm); brown (10YR 5/3) very fine sandy loam, brown (10YR 4/3), moist; 7 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine irregular and few fine tubular pores; violently effervescent; moderately alkaline, pH 8.0; clear wavy boundary.

C4—32 to 44 inches (81 to 112 cm); pale brown (10YR 6/3) silt loam, brown (10YR 4/3), moist; 10 percent clay; massive; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; many very fine and fine and common medium tubular pores; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

C5—44 to 60 inches (112 to 152 cm); brown (10YR 5/3) silt loam, dark brown (10YR 3/3), moist; 12 percent clay; massive; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine and fine and common medium tubular pores; violently effervescent; slightly alkaline, pH 7.4.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 15 percent

Calcium carbonate equivalent: 1 to 4 percent

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Gypsum: 0 to 4 percent

C horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4 dry or moist

Texture: silt loam, very fine sandy loam, fine sandy loam with strata of silty clay loam, fine sand, clay loam or sandy loam

Vinton soils

Taxonomic classification: Sandy, mixed, thermic Typic Torrifuvents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 85 percent

woody debris: 5 percent

bare soil: 10 percent

rock fragments: 0 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 5.8 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: occasional

Runoff class: very low

Hydrologic group: A

Ecological site name: Prosopis velutina/Sporobolus wrightii

Ecological site number: F040XA124AZ

Present vegetation: mesquite, tamarisk, Arizona fescue, willow

Land capability (irrigated): 2e

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; about 400 feet south and 2,100 feet west of the northeast corner of Section 2, Township 5 S, Range 14 E

Geographic Coordinate System:

33° 1' 56.00" north, 110° 53' 12.00" west

C1—0 to 3 inches (0 to 8 cm); brown (10YR 5/3) loamy very fine sand, dark brown (10YR 3/3), moist; 5 percent clay; weak very thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine tubular and vesicular pores; strongly effervescent; slightly alkaline, pH 7.8; abrupt wavy boundary.

C2—3 to 10 inches (8 to 25 cm); brown (10YR 5/3) very fine sandy loam, dark brown (10YR 3/3), moist; 7 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and few medium roots; common very fine tubular and

irregular pores; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

C3—10 to 55 inches (25 to 140 cm); brown (10YR 5/3) loamy very fine sand, dark brown (10YR 3/3), moist; 5 percent clay; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many fine irregular pores; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

C4—55 to 65 inches (140 to 165 cm); brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3), moist; 5 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many fine irregular pores; strongly effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 7 percent

Calcium carbonate equivalent: 1 to 4 percent

Gypsum: 0 to 4 percent

C horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: loamy fine sand, loamy very fine sand, very fine sandy loam, fine sand, sand with strata of fine sandy loam, sandy loam, silt loam

44—Gilman fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

Landform(s): alluvial fans, flood plains

Elevation: 1,500 to 1,600 feet (457 to 488 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Gilman and similar soils: 85 percent

Minor components: Vint, Dateland, Denure

Soil Properties and Qualities

Gilman soils

Taxonomic classification: Coarse-loamy, mixed, superactive, calcareous, hyperthermic Typic Torrfluents

Geomorphic position: proximal, distal, and drainageways

Parent material: mixed fan and stream alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

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Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 95 percent (cotton)
woody debris: 5 percent
bare soil: 5 percent
rock fragments
gravel: 5 percent
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Available water capacity total inches: 9.8 (high)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: occasional
Runoff class: very low
Hydrologic group: B
Ecological site name: Loamy Swale 7–10" p.z.
Ecological site number: R040XB211AZ
Present vegetation: big sagebrush, bush muhly, creosotebush, ironwood, paloverde, mesquite, slim tridens, threewawn
Land capability (irrigated): 3w
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 2,400 feet south and 2,300 feet west of the northeast corner of Section 12, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 44.90" north, 111° 16' 48.84" west

Ap1—0 to 3 inches (0 to 8 cm); brown (7.5YR 4/4) fine sandy loam, dark brown (7.5YR 3/4), moist; 14 percent clay; weak thick platy parting to weak fine cloddy structure; soft, very friable, slightly sticky and moderately plastic; many fine and medium roots; few fine irregular pores; violently effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Ap2—3 to 13 inches (8 to 33 cm); brown (7.5YR 4/4) loam, dark brown (7.5YR 3/4), moist; 18 percent clay; moderate medium cloddy structure; hard, friable, moderately sticky and moderately plastic; few very fine and many fine roots; common medium tubular pores; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

C1—13 to 26 inches (33 to 66 cm); brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4), moist; 15 percent clay; massive; hard, friable, slightly sticky and moderately plastic; common fine and medium roots; many fine and medium tubular pores; 5 percent gravel; violently effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

C2—26 to 44 inches (66 to 112 cm); dark brown (7.5YR 3/4) loam, dark brown (7.5YR 3/3), moist; 18 percent clay; massive; hard, firm, moderately sticky and very plastic; common fine, medium, and few coarse roots; many fine and few medium tubular pores; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

C3—44 to 60 inches (112 to 152 cm); brown (7.5YR 4/4) silt loam, dark brown (7.5YR 3/4), moist; 15 percent clay; massive; soft, very friable, slightly sticky and very plastic;

common fine roots; common fine tubular pores; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 10 to 18 percent

Calcium carbonate equivalent: 1 to 4 percent

A horizons

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: fine sandy loam, loam

C horizons

Hue: 10YR, 7.5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: very fine sandy loam, loam, silt loam

45—Gilman loam, 0 to 2 percent slopes

Map Unit Setting

Landform(s): alluvial fans, flood plains

Elevation: 1,500 to 1,600 feet (457 to 488 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Gilman and similar soils: 90 percent

Minor components: Brios, Gilman that have sandy loam surface textures, Central Arizona Project Canal

Soil Properties and Qualities

Gilman soils

Taxonomic classification: Coarse-loamy, mixed, superactive, calcareous, hyperthermic Typic Torrfluvents

Geomorphic position: proximal, distal, and drainageways

Parent material: mixed fan and stream alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Physical cover
canopy plant cover: 90 percent (cotton field)
woody debris: 5 percent
bare soil: 5 percent
rock fragments: 0 percent
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Available water capacity total inches: 8.0 (high)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: occasional
Runoff class: very low
Hydrologic group: B
Ecological site name: Loamy Swale 7–10" p.z.
Ecological site number: R040XB211AZ
Present vegetation: big galleta, bush muhly, threeawn, desert globemallow, dropseed, mesquite, wolfberry
Land capability (irrigated): 3w
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 1,950 feet north and 600 feet east of the southwest corner of Section 7, Township 4 S, Range 11 E
Geographic Coordinate System:
33° 5' 38.00" north, 111° 15' 56.00" west

Ap1—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/3) loam, brown (7.5YR 4/4), moist; 18 percent clay; moderate thick and very thick platy structure; soft, very friable, moderately sticky and moderately plastic; few very fine roots; many fine irregular pores; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Ap2—3 to 11 inches (8 to 28 cm); brown (7.5YR 5/3) loam, brown (7.5YR 4/4), moist; 20 percent clay; moderate fine and medium cloddy structure; slightly hard, friable, moderately sticky and moderately plastic; few very fine roots; many fine irregular pores; violently effervescent; slightly alkaline, pH 7.4; clear smooth boundary.

Ck—11 to 24 inches (28 to 61 cm); brown (7.5YR 5/3) loam, brown (7.5YR 4/3), moist; 16 percent clay; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and moderately plastic; few very fine and fine roots; many fine irregular and few fine tubular pores; common fine carbonate filaments; violently effervescent; slightly alkaline, pH 7.6; clear smooth boundary.

C1—24 to 45 inches (61 to 114 cm); brown (7.5YR 5/3) fine sandy loam, brown (7.5YR 4/4), moist; 8 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine tubular pores; violently effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

C2—45 to 60 inches (114 to 152 cm); brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/4), moist; 6 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; 5 percent gravel; violently effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Average percent clay in the control section: 5 to 20 percent
Calcium carbonate equivalent: 2 to 10 percent

A horizons

Hue: 7.5YR, 10YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: loam
Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

C horizons

Hue: 7.5YR, 10YR
Value: 4 or 5 dry, 3 to 5 moist
Chroma: 3 or 4, dry or moist
Texture: loam, fine sandy loam, sandy loam
Reaction: 7.9 to 8.4 (moderately alkaline)

46—Glenbar clay loam, 0 to 2 percent slopes

Map Unit Setting

Landform(s): flood plains
Elevation: 1,500 to 1,600 feet (457 to 488 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Glenbar and similar soils: 85 percent

Minor components: Gilman, Glenbar that have salts in the lower part

Soil Properties and Qualities

Glenbar soils

Taxonomic classification: Fine-silty, mixed, superactive, calcareous, hyperthermic

Typic Torrifuvents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 90 percent (cotton field)

woody debris: 5 percent

bare soil: 5 percent

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 0.20 to 0.57 inches per hour (1.40 to 4.00 micrometers per second)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Available water capacity total inches: 11.4 (very high)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: occasional

Runoff class: low

Hydrologic group: B

Ecological site name: Loamy Swale 7–10" p.z.

Ecological site number: R040XB211AZ

Present vegetation: bush muhly, threeawn, mesquite, big galleta, desert globemallow, vine mesquite, wolfberry

Land capability (irrigated): 3w

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 500 feet north and 400 feet west of the southeast corner of Section 12, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 27.00" north, 111° 16' 8.00" west

Ap—0 to 7 inches (0 to 18 cm); brown (7.5YR 4/3) clay loam, dark brown (7.5YR 3/2), moist; 39 percent clay; weak thin and medium platy structure; soft, very friable, moderately sticky and moderately plastic; few very fine and fine roots; many fine irregular pores; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Ck1—7 to 18 inches (18 to 46 cm); brown (7.5YR 5/3) clay loam, dark brown (7.5YR 3/3), moist; 39 percent clay; moderate fine and medium subangular blocky structure; moderately hard, firm, moderately sticky and moderately plastic; few very fine and fine roots; many very fine and fine tubular pores; many continuous distinct carbonate coats lining pores; many fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Ck2—18 to 31 inches (46 to 79 cm); brown (7.5YR 5/3) silty clay loam, dark brown (7.5YR 3/2), moist; 31 percent clay; moderate fine and medium subangular blocky structure; moderately hard, firm, moderately sticky and moderately plastic; few fine and coarse roots; many very fine tubular pores; common fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Ck3—31 to 60 inches (79 to 152 cm); brown (7.5YR 5/3) silty clay loam, dark brown (7.5YR 3/3), moist; 29 percent clay; massive; slightly hard, friable, moderately sticky and moderately plastic; common fine, medium, coarse and few very coarse roots; many very fine and fine tubular pores; common fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 27 to 35 percent

Calcium carbonate equivalent: 5 to 15 percent

A horizon

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 to 4 dry or moist

Texture: clay loam

C horizons

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 3 or 4 moist
Chroma: 2 or 3, dry or moist
Texture: clay loam, silty clay loam

47—Glendale-Hantz complex, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains
Elevation: 1,750 to 2,100 feet (533 to 640 meters)
Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)
Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)
Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)
Frost-free period: 220 to 280 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Glendale and similar soils: 50 percent
Hantz and similar soils: 40 percent
60 percent farmland
40 percent woodland
Minor components: Gila, Vinton, Hantz soils that have thick loamy surfaces

Soil Properties and Qualities

Glendale soils

Taxonomic classification: Fine-silty, mixed, superactive, calcareous, thermic Typic Torrfluvents
Geomorphic position: drainageways
Parent material: mixed stream alluvium
Slope: 0 to 5 percent
Surface cover:
Biological crust
cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 0 percent
woody debris: 5 percent
bare soil: 95 percent (plowed farm field)
rock fragments: 0 percent
Drainage class: well drained
Ksat solum: 0.20 to 1.98 inches per hour (1.40 to 14.00 micrometers per second)
Available water capacity total inches: 11.0 (very high)
Shrink-swell potential: about 4.5 LEP (moderate)
Flooding hazard: occasional
Runoff class: low
Hydrologic group: B
Ecological site name: Prosopis velutina/Sporobolus wrightii

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site number: F040XA124AZ

Present vegetation: mesquite, tamarisk, Arizona fescue

Land capability (irrigated): 2e

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; about 1,700 feet south and 1,400 feet west of the northeast corner of Section 35, Township 4 S, Range 14 E

Geographic Coordinate System:

33° 2' 32.00" north, 110° 52' 56.00" west

Ap1—0 to 3 inches (0 to 8 cm); brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3), moist; 30 percent clay; strong fine and medium cloddy structure; hard, firm, very sticky and very plastic; many very fine roots; common very fine tubular pores; violently effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Ap2—3 to 13 inches (8 to 33 cm); brown (10YR 5/3) silty clay loam, brown (10YR 4/3), moist; 30 percent clay; moderate fine and medium cloddy structure; soft, very friable, moderately sticky and very plastic; many very fine and fine roots; common very fine tubular pores; violently effervescent; moderately alkaline, pH 8.2; clear smooth boundary.

C1—13 to 18 inches (33 to 46 cm); brown (10YR 5/3) silty clay loam, brown (10YR 4/3), moist; 32 percent clay; moderate fine and medium angular blocky structure; slightly hard, firm, moderately sticky and very plastic; many very fine and fine roots; many very fine tubular and interstitial pores; violently effervescent; moderately alkaline, pH 8.2; clear smooth boundary.

C2—18 to 29 inches (46 to 74 cm); brown (10YR 5/3) silt loam, brown (10YR 4/3), moist; 26 percent clay; moderate fine and medium angular blocky structure; slightly hard, firm, slightly sticky and moderately plastic; common very fine roots; common very fine tubular pores; violently effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

C3—29 to 48 inches (74 to 122 cm); brown (10YR 5/3) silt loam, dark brown (10YR 3/3), moist; 26 percent clay; massive; soft, very friable, slightly sticky and moderately plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; common fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

C4—48 to 60 inches (122 to 152 cm); brown (10YR 5/3) silt loam, dark brown (10YR 3/3), moist; 24 percent clay; massive; soft, very friable, moderately sticky and moderately plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; violently effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 18 to 35 percent

Calcium carbonate equivalent: 1 to 10 percent

Ap horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 2 to 4, dry or moist

Texture: loam, silt loam, silty clay loam

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

C horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: silt loam, silty clay loam, clay loam with thin strata of silty clay, very fine sandy loam, loamy very fine sand

Gypsum: 0 to 4 percent

Hantz soils

Taxonomic classification: Fine, mixed, superactive, calcareous, thermic Vertic Torrfluvents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 0 percent

woody debris: 5 percent

bare soil: 95 percent (plowed farm field)

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 0.06 to 0.20 inches per hour (0.42 to 1.40 micrometers per second)

Available water capacity total inches: 9.0 (high)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: occasional

Runoff class: medium

Hydrologic group: C

Ecological site name: Prosopis velutina/Sporobolus wrightii

Ecological site number: F040XA124AZ

Present vegetation: mesquite, tamarisk, Arizona fescue

Land capability (irrigated): 2e

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; about 600 feet south and 800 feet west of the northeast corner of Section 36, Township 4 S, Range 14 E

Geographic Coordinate System:

33° 2' 44.00" north, 110° 52' 48.00" west

Ap—0 to 5 inches (0 to 13 cm); brown (7.5YR 4/3) silty clay, dark brown (7.5YR 3/3), moist; 46 percent clay; strong very fine and fine, and medium cloddy structure; very hard, very firm, very sticky and very plastic; many very fine and fine roots; few very fine tubular pores; violently effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

C1—5 to 28 inches (13 to 71 cm); pinkish gray (7.5YR 6/2) silty clay, brown (7.5YR 4/3), moist; 58 percent clay; moderate medium and coarse wedge parting to moderate fine and medium angular blocky structure; extremely hard, slightly rigid,

very sticky and very plastic; many very fine and fine and few medium roots; common fine tubular pores; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

C2—28 to 60 inches (71 to 152 cm); pinkish gray (7.5YR 6/2) silty clay, brown (7.5YR 4/3), moist; 48 percent clay; massive; slightly hard, firm, very sticky and very plastic; few very fine roots; many very fine and fine tubular pores; violently effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Soil cracking: many vertical cracks 0.25 to 0.50 inches wide from the surface to a depth of 28 inches

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 40 to 60 percent

Calcium carbonate equivalent: 1 to 10 percent

Ap horizon

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 to 4 dry, 2 or 3 moist

Texture: silt loam, silty clay loam, silty clay

C horizons

Hue: 7.5YR, 10YR

Value: 3 to 6 dry, 3 or 4 moist

Chroma: 2 to 4, dry or moist

Texture: silty clay loam, clay loam, clay, silty clay

Gypsum: 0 to 4 percent

48—Gran-Rock outcrop-Pantano complex, 20 to 60 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 1,790 to 3,080 feet (545 to 939 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Gran and similar soils: 65 percent

Rock outcrop: 20 percent

Pantano and similar soils: 15 percent

Minor components: Stagecoach, Delnorte, Topawa, Anklam soils that are moderately deep

Soil Properties and Qualities

Gran soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic, shallow Typic Haplargids

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 20 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 10 percent

 bare soil: 30 percent

rock fragments

 gravel: 55 percent

 cobble: 25 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic; 20 to 40 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.1 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Shallow Hills 10–13" p.z.

Ecological site number: R040XA105AZ

Present vegetation: triangle bursage, paloverde, brittlebush, flattop buckwheat, jojoba, ratany, staghorn cholla, threeawn, jumping cholla, wolfberry

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle North Butte; about 1,617 feet and 429 feet west of the southeast corner of Section 17, Township 4 S, Range 11 E

Geographic Coordinate System:

33° 4' 45.50" north, 111° 14' 22.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/3), moist; 10 percent clay; moderate thick and very thick platy structure; slightly hard, friable, nonsticky and nonplastic; many very fine roots; many very fine vesicular and tubular pores; 50 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt—2 to 14 inches (5 to 36 cm); reddish brown (5YR 4/4) very gravelly clay, dark reddish brown (5YR 3/3), moist; 45 percent clay; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; many very fine roots; many very fine interstitial and tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 45 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

Crt—14 to 25 inches (36 to 64 cm); many continuous distinct clay films along fractures; weathered granite bedrock; abrupt wavy boundary.

R—25 to 60 inches (64 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 5YR, 7.5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sandy loam, coarse sandy loam

Bt horizon

Hue: 2.5 YR, 5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 4 or 6 dry, 3 to 6 moist

Texture: clay loam, clay

Cr and R horizons

Granite bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of granite bedrock. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the summit of mountains.

Pantano soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Typic Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 20 to 60 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 30 percent

woody debris: 10 percent

bare soil: 30 percent

rock fragments

gravel: 55 percent

cobble: 15 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic; 15 to 40 inches to bedrock, lithic

Drainage class: well drained

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 0.9 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Limy Hills 10–13" p.z.

Ecological site number: R040XA129AZ

Present vegetation: triangle bursage, paloverde, brittlebush, creosotebush, jumping cholla, ratany, saguaro, purple threeawn

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle North Butte; about 1,468 feet north and 759 feet west of the southeast corner of Section 17, Township 4 S, Range 11 E

Geographic Coordinate System:

33° 4' 43.80" north, 111° 14' 6.10" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; weak medium platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 40 percent gravel; slightly effervescent, 3 percent calcium carbonate equivalent; slightly alkaline, pH 7.6; clear smooth boundary.

Bk1—1 inch to 10 inches (3 to 25 cm); brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/4), moist; 14 percent clay; weak very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine interstitial and tubular pores; many continuous distinct carbonate coats on rock fragments; 50 percent gravel; strongly effervescent, 8 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk2—10 to 15 inches (25 to 38 cm); brown (7.5YR 5/4) extremely gravelly sandy loam, brown (7.5YR 4/4), moist; 18 percent clay; massive; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine interstitial pores; many continuous distinct carbonate coats on rock fragments; 75 percent gravel; violently effervescent, 11 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Crk—15 to 21 inches (38 to 53 cm); many continuous distinct carbonate coats along fractures; weathered granite bedrock; abrupt wavy boundary.

R—21 to 60 inches (53 to 152 cm); unweathered granite bedrock.

Range in Characteristics

Rock fragments: 35 to 75 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, coarse sandy loam
Calcium carbonate equivalent: 0 to 5 percent

Bk horizons

Hue: 10YR, 7.5YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry, 3 to 6 moist
Texture: loamy sand, sandy loam
Calcium carbonate equivalent: 5 to 20 percent

Cr and R horizons

Granite bedrock

49—Granolite-Rock outcrop-Akela complex, 5 to 45 percent slopes

Map Unit Setting

Landform(s): hills

Elevation: 2,000 to 3,500 feet (610 to 1,067 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Granolite and similar soils: 50 percent

Rock outcrop: 25 percent

Akela and similar soils: 15 percent

Minor components: Soils that have less than 35 percent rock fragments,
Stagecoach

Soil Properties and Qualities

Granolite soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic Lithic
Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from andesite

Slope: 5 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 5 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

rock fragments

gravel: 60 percent

cobble: 25 percent

Depth to restrictive feature(s): 8 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.4 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Clayey Slopes 10–13" p.z.

Ecological site number: R040XA103AZ

Present vegetation: pricklypear and cholla, jojoba, whitethorn, annual grasses, ocotillo, paloverde, hedgehog cactus, catclaw acacia, false mesquite

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Holy Joe Peak; about 1,000 feet north and 2,300 feet west of the southeast corner of Section 28, Township 7 S, Range 17 E

Geographic Coordinate System:

32° 47' 33.00" north, 110° 36' 40.00" west

A—0 to 1 inch (0 to 3 cm); dark reddish gray (5YR 4/2) very gravelly clay loam, dark reddish brown (5YR 3/3), moist; 30 percent clay; weak fine granular structure; soft, very friable, moderately sticky and moderately plastic; few fine roots; few fine irregular pores; 30 percent gravel and 15 percent cobble; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bt1—1 inch to 11 inches (3 to 28 cm); dark reddish gray (5YR 4/2) very gravelly clay, reddish brown (5YR 4/3), moist; 55 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; many fine roots; few fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common pressure faces; 40 percent gravel; noneffervescent; slightly alkaline, pH 7.6; clear wavy boundary.

Bt2—11 to 17 inches (28 to 43 cm); dark reddish gray (5YR 4/2) very gravelly clay, reddish brown (5YR 4/3), moist; 47 percent clay; strong fine subangular blocky structure; hard, firm, moderately sticky and moderately plastic; few fine roots; few fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common pressure faces; 40 percent gravel and 10 percent cobble; noneffervescent; slightly alkaline, pH 7.6.

R—17 to 60 inches (43 to 152 cm); unweathered andesite bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chroma: 2 to 4, dry or moist

Texture: sandy loam, loam, clay loam

Bt horizons

Hue: 7.5YR, 5YR

Value: 3 or 4, dry or moist

Chroma: 2 to 4, dry or moist

Texture: sandy clay loam, clay loam, clay

R horizon

Andesite, basalt, and volcanic bedrock

Some pedons have thin weathered bedrock (Cr) above the unweathered bedrock.

Granolite as used in this mapping unit is a taxadjunct to the series because it has a lithic contact. Granolite series is Clayey-skeletal, mixed, superactive, thermic shallow Typic Haplargids.

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and outcroppings of basalt, andesite, and volcanic bedrocks. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Akela soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, calcareous, thermic Lithic Torriorthents.

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from andesite

Slope: 5 to 45 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 25 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 60 percent

cobble: 20 percent

Depth to restrictive feature(s): 8 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.1 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Hills 10–13" p.z.

Ecological site number: R040XA129AZ

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Present vegetation: pricklypear and cholla, jojoba, whitethorn, annual grasses, desert senna, catclaw acacia, ocotillo, fluffgrass, paloverde, threeawn, hedgehog cactus, bush muhly, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Holy Joe Peak; about 1,000 feet north and 2,500 feet east of the southwest corner of Section 28, Township 7 S, Range 17 E

Geographic Coordinate System:

32° 47' 33.00" north, 110° 37' 5.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/3) gravelly sandy loam, brown (7.5YR 4/3), moist; 10 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; few fine roots; few fine irregular pores; 20 percent gravel; slightly effervescent, 2 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; clear smooth boundary.

Bk1—1 inch to 8 inches (3 to 20 cm); brown (7.5YR 5/4) very gravelly loam, dark brown (7.5YR 3/3), moist; 14 percent clay; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine and medium roots; common fine tubular pores; many continuous distinct carbonate coats on rock fragments; 40 percent gravel and 5 percent cobble; strongly effervescent, 4 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk2—8 to 14 inches (20 to 36 cm); brown (7.5YR 5/3) very gravelly sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine tubular pores; many continuous distinct carbonate coats on faces of peds and rock fragments; many fine and medium carbonate filaments; 40 percent gravel; violently effervescent, 7 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

R—14 to 60 inches (36 to 152 cm); unweathered andesite bedrock.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

Rock fragments: 5 to 25 percent

Calcium carbonate equivalent: 1 to 5 percent

Bk horizons

Hue: 10YR, 7.5YR

Value: 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

Rock fragments: 35 to 50 percent

Calcium carbonate equivalent: 1 to 10 percent

R horizon

Andesite, basalt, and volcanic bedrock

Some pedons have weak to strong calcium carbonate cementation.

50—Haplogypsids, 0 to 5 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,190 to 2,390 feet (669 to 730 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40 -1 Upper Sonoran Desert Shrub

Map Unit Composition

Haplogypsids and similar soils: 85 percent

Minor components: Whitecliff, Haplogypsids containing more than 35 percent clay,
Rock outcrops

Soil Properties and Qualities

Haplogypsids soils

Taxonomic classification: Haplogypsids

Geomorphic position: summits

Parent material: gypsiferous and calcareous lacustrine deposits

Slope: 0 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 50 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 30 percent

Physical cover

 canopy plant cover: 20 percent

 woody debris: 5 percent

 bare soil: 0 percent

rock fragments

 channer: 20 percent

Depth to restrictive feature(s): 20 to 40 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

Available water capacity total inches: 2.7 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Hydrologic group: C

Ecological site name: Gypsum Upland 10–13" p.z.

Ecological site number: R040XA126AZ

Present vegetation: creosotebush, annual forbs, whitethorn acacia, annual grasses, fourwing saltbush, goldeneye, bush muhly, catclaw acacia, perennial forbs, Mormon tea, alkali sacaton, Christmas cholla, giant sacaton, graythorn, range ratany

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Lookout Mountain; about 1,200 feet west and 2,000 feet south of the northeast corner of Section 14, Township 7 S, Range 16 E

Geographic Coordinate System:

32° 49' 36.00" north, 110° 40' 26.50" west

A—0 to 2 inches (0 to 5 cm); very pale brown (10YR 8/2) loam, brown (10YR 5/3), moist; 12 percent clay; strong medium platy structure; soft, very friable, nonsticky and slightly plastic; few fine roots; many fine irregular pores; strongly effervescent, 3 percent calcium carbonate equivalent and 25 percent gypsum; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bky1—2 to 9 inches (5 to 23 cm); light gray (10YR 7/2) loam, brown (10YR 5/3), moist; 10 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many fine irregular pores; common continuous distinct carbonate coats on faces of peds and rock fragments; common fine gypsum masses; many fine and medium gypsum crystals; strongly effervescent, 3 percent calcium carbonate equivalent and 30 percent gypsum; slightly alkaline, pH 7.4; clear smooth boundary.

Bky2—9 to 20 inches (23 to 51 cm); light brownish gray (10YR 6/2) sandy loam, dark yellowish brown (10YR 4/4), moist; 7 percent clay; massive; slightly hard, friable, nonsticky and nonplastic; common fine and medium roots; few fine irregular pores; common continuous distinct carbonate coats on faces of peds and rock fragments; few very fine gypsum masses; many medium and coarse gypsum crystals; strongly effervescent, 3 percent calcium carbonate equivalent and 40 percent gypsum; slightly alkaline, pH 7.6; clear wavy boundary.

Bky3—20 to 32 inches (51 to 81 cm); pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4), moist; 7 percent clay; massive; slightly hard, firm, nonsticky and nonplastic; common very fine and fine roots and few medium roots; few fine irregular pores; common continuous distinct carbonate coats on faces of peds and rock fragments; many medium and coarse gypsum crystals; strongly effervescent, 4 percent calcium carbonate equivalent and 40 percent gypsum; slightly alkaline, pH 7.8; gradual wavy boundary.

Cry—32 to 60 inches (81 to 152 cm); 80 percent gypsum; fractured gypsum bedrock.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 8 dry, 4, 5, or 8 moist

Chroma: 1 to 4 dry, 3 or 4 moist

Texture: loam, fine sandy loam, silt loam, very fine sandy loam

Bky horizon

Hue: 10YR, 7.5YR

Value: 6 to 8 dry, 4 to 8 moist

Chroma: 1 to 3 dry, 3 or 4 moist

Texture: loam, sandy loam, silt loam

Cry horizon

Consolidated calcareous and gypsiferous sedimentary bedrocks that are interbedded with nonconsolidated (lacustrine sediments) materials. Can be cemented with gypsum, calcium carbonate, and/or silica. Bedrock is hard to extremely hard and can be brittle.

This soil has a high hazard of erosion by piping, gully erosion, headcutting, and sheet flow. Concentration of water flow will cause severe erosion (crevasses).

51—Haplogypsids-Whitecliff-Badlands complex, 1 to 80 percent slopes

Map Unit Setting

Landform(s): Haplogypsids – fan terraces; Whitecliff – alluvial fans

Elevation: 2,000 to 3,200 feet (610 to 975 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40–Sonoran Basin and Range

Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Haplogypsids and similar soils: 45 percent

Whitecliff and similar soils: 25 percent

Badlands: 20 percent

Minor components: Ugyp, Contention, Stagecoach, Rock outcrop-Diatomite, Haplogypsids that have pH greater than 9.0

Soil Properties and Qualities

Haplogypsids soils

Taxonomic classification: Haplogypsids

Geomorphic position: summits

Parent material: gypsiferous and calcareous lacustrine deposits

Slope: 5 to 80 percent

Surface cover:

Biological crust

 cyanobacteria: 80 percent 0.24-inch thick crust

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 30 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Physical cover
canopy plant cover: 20 percent
woody debris: 5 percent
bare soil: 5 percent
rock fragments: 0 percent
Depth to restrictive feature(s): 30 to 60 inches to bedrock, lithic; 45 to 60 inches to strongly contrasting textural stratification
Drainage class: well drained
Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.57 inches per hour (0.00 to 4.00 micrometers per second)
Available water capacity total inches: 3.9 (low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: high
Hydrologic group: B
Ecological site name: Gypsum Upland 10–13" p.z.
Ecological site number: R040XA126AZ
Present vegetation: creosotebush, hedgehog cactus, annual grasses, brittlebush, mesquite, pricklypear and cholla, giant sacaton, paloverde, mormon tea, ocotillo
Land capability (non irrigated): 8

Typical Profile

Location

Public Land Survey: USGS Quadrangle Clark Ranch; about 400 feet south and 1,100 feet east of the northwest corner of Section 28, Township 8 S, Range 17 E

Geographic Coordinate System:

32° 42' 50.00" north, 110° 37' 2.00" west

Bky1—0 to 8 inches (0 to 20 cm); white (10YR 8/1) sandy loam, light yellowish brown (10YR 6/4), moist; 5 percent clay; massive; soft, very friable, nonsticky and slightly plastic; common fine roots; many fine irregular pores; common fine carbonate masses; many very fine gypsum crystals; violently effervescent, 3 percent calcium carbonate equivalent and 30 percent gypsum; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bky2—8 to 24 inches (20 to 61 cm); very pale brown (10YR 8/2) loam, brown (10YR 5/3), moist; 7 percent clay; massive; soft, very friable, nonsticky and slightly plastic; common fine and medium roots; many fine irregular pores; common fine carbonate masses; many medium and coarse gypsum crystals; violently effervescent, 4 percent calcium carbonate equivalent and 30 percent gypsum; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bky3—24 to 36 inches (61 to 91 cm); brown (7.5YR 5/3) clay, brown (7.5YR 4/3), moist; 42 percent clay; strong fine and medium platy structure; hard, firm, moderately sticky and very plastic; few medium roots; few fine tubular pores; common fine carbonate masses; many fine and coarse gypsum crystals; violently effervescent, 5 percent calcium carbonate equivalent and 30 percent gypsum; moderately alkaline, pH 8.0; abrupt smooth boundary.

R—36 to 50 inches (91 to 127 cm); unweathered consolidated gypsum bedrock; abrupt smooth boundary.

Cky—50 to 60 inches (127 to 152 cm); light brown (7.5YR 6/3) silt loam, strong brown (7.5YR 4/6), moist; 24 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; common fine

tubular pores; common fine carbonate masses; common very fine gypsum crystals; violently effervescent, 4 percent calcium carbonate equivalent and 30 percent gypsum; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 0 to 10 percent; may contain up to 60 percent gypsum crystals and consolidated gypsum fragments

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 7 to 55 percent

Calcium carbonate equivalent: 1 to 25 percent

Gypsum: 10 to 50 percent

Bky and Cky horizons

Hue: 10YR, 2.5Y

Value: 5 to 8 dry, 4 to 7 moist

Chroma: 1 to 4 dry, 2 to 6 moist

Texture: loam, very fine sandy loam, silt loam, clay loam, silty clay loam, clay

R horizon

Consolidated calcareous and gypsiferous sedimentary bedrocks that are interbedded with nonconsolidated (lacustrine sediments) materials. Can be cemented with gypsum, calcium carbonate, and/or silica. Bedrock is hard to extremely hard and can be brittle.

With depth there are consolidated (diatomite and calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials.

This soil has a high hazard of erosion by piping, gully erosion, headcutting, and sheet flow. Concentration of water flow will cause severe erosion (crevasses).

Bedrock is not present in all pedons within 60 inches.

Whitecliff soils

Taxonomic classification: Fine-silty, mixed, superactive, thermic Leptic Haplogypsis

Geomorphic position: proximal and distal

Parent material: gypsiferous and calcareous lacustrine deposits

Slope: 1 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 50 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 10 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 5 percent

bare soil: 10 percent

rock fragments

gravel: 10 percent

Drainage class: well drained

Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)

Available water capacity total inches: 8.3 (high)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: very rare

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Runoff class: low

Hydrologic group: B

Ecological site name: Gypsum Upland 10–13" p.z.

Ecological site number: R040XA126AZ

Present vegetation: creosotebush, giant sacaton, annual grasses, mesquite

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Clark Ranch; about 900 feet south and 1,450 feet west of the northeast corner of Section 28, Township 8 S, Range 17 E

Geographic Coordinate System:

32° 42' 53.00" north, 110° 36' 58.00" west

A—0 to 1 inch (0 to 3 cm); pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4), moist; 22 percent clay; moderate medium and thick platy structure; soft, very friable, slightly sticky and moderately plastic; common fine vesicular pores; common fine gypsum masses and crystals; violently effervescent, 3 percent calcium carbonate equivalent and 8 percent gypsum; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bky1—1 inch to 13 inches (3 to 33 cm); pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4), moist; 20 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and moderately plastic; few medium roots; few fine tubular pores; many fine gypsum crystals; many very fine and fine gypsum and carbonate masses; violently effervescent, 4 percent calcium carbonate equivalent and 23 percent gypsum; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bky2—13 to 18 inches (33 to 46 cm); pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4), moist; 10 percent clay; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; common fine irregular pores; many very fine gypsum crystals; many very fine gypsum and carbonate masses; violently effervescent, 6 percent calcium carbonate equivalent and 23 percent gypsum; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bky3—18 to 60 inches (46 to 152 cm); pale brown (10YR 6/3) silt loam, dark yellowish brown (10YR 4/4), moist; 24 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and moderately plastic; few fine roots; few fine tubular pores; common fine and medium gypsum crystals; many fine and medium gypsum and carbonate masses; violently effervescent, 5 percent calcium carbonate equivalent and 23 percent gypsum; slightly alkaline, pH 7.8.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 18 to 27 percent

A horizon

Hue: 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 or 3 dry, 3 or 4 moist

Texture: loam, silt loam, very fine sandy loam

Calcium carbonate equivalent: 1 to 5 percent

Gypsum: 0 to 15 percent

Bky horizons

Hue: 10YR

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: loam, silt loam, sandy loam, thin strata for coarser textures

Calcium carbonate equivalent: 1 to 15 percent

Gypsum: 5 to 40 percent

This soil has a high hazard of erosion by piping, gully erosion, headcutting, and sheet flow. Concentration of water flow will cause severe erosion (crevasses).

Gypsum content is inferred from similar samples collected and analyzed from the same area.

Badlands

A landscape which is intricately dissected and characterized by a very fine drainage network that has high drainage densities and short, very steep and steep slopes (70 to 90 percent) with narrow interfluves. Badlands develop on surfaces that have little or no vegetation cover, overlying consolidated (calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials.

52—Hayhook-Riverwash complex, 1 to 5 percent slopes

Map Unit Setting

Landform(s): alluvial fans, fan terraces

Elevation: 2,090 to 2,590 feet (638 to 790 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Hayhook and similar soils: 70 percent

Riverwash: 20 percent

Minor components: Bucklebar, Queencreek

Soil Properties and Qualities

Hayhook soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes or proximal and distal

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

woody debris: 5 percent
bare soil: 45 percent
rock fragments
 gravel: 15 percent
Drainage class: well drained
Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)
Available water capacity total inches: 5.3 (moderate)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very low
Hydrologic group: B
Ecological site name: Sandy Loam Upland 10–13" p.z. Deep
Ecological site number: R040XA117AZ
Present vegetation: annual forbs, paloverde, triangle bursage, annual grasses, saguaro, poverty threeawn, ironwood, Mormon tea, barrel cactus, creosotebush
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Desert Peak; about 150 feet east and 450 feet north of the southwest corner of Section 3, Township 10 S, Range 11 E

Geographic Coordinate System:
32° 35' 5.00" north, 111° 12' 32.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 9 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine irregular pores; 7 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bw1—2 to 10 inches (5 to 25 cm); reddish yellow (7.5YR 6/6) sandy loam, brown (7.5YR 4/4), moist; 13 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; many very fine irregular pores; 10 percent gravel; noneffervescent; neutral, pH 7.2; abrupt smooth boundary.

Bw2—10 to 22 inches (25 to 56 cm); strong brown (7.5YR 5/6) gravelly sandy loam, brown (7.5YR 4/4), moist; 13 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; 20 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bk—22 to 40 inches (56 to 102 cm); light brown (7.5YR 6/4) gravelly loamy sand, brown (7.5YR 4/4), moist; 9 percent clay; single grain; loose, nonsticky and nonplastic; common very fine roots; many very fine irregular pores; common patchy distinct carbonate coats on rock fragments; 20 percent gravel; strongly effervescent; moderately alkaline, pH 8.2; abrupt wavy boundary.

2Btkb—40 to 60 inches (102 to 152 cm); yellowish red (5YR 5/6) sandy loam, reddish brown (5YR 4/4), moist; 17 percent clay; moderate fine and medium subangular blocky structure; slightly hard, firm, moderately sticky and very plastic; few very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; few fine carbonate masses; 7 percent gravel; slightly effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: 0 to 25 percent
Reaction: 6.6 to 8.4 (neutral to moderately alkaline)
Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 7.5YR
Value: 5 dry, 4 moist
Chroma: 4 dry, 3 or 4 moist
Texture: sandy loam

Bw and Bk horizons

Hue: 7.5YR
Value: 5 or 6 dry, 4 moist
Chroma: 4 to 6 dry, 3 or 4 moist
Texture: sandy loam, loamy sand
Calcium carbonate equivalent: 0 to 3 percent

2Btkb horizons

Hue: 5YR
Value: 5 dry, 4 moist
Chroma: 4 to 6 dry, 3 or 4 moist
Texture: sandy clay loam, sandy loam
Calcium carbonate equivalent: 1 to 5 percent
Not present in all pedons.

Riverwash

Width: 2 to 40 feet
Depth of water when present: 0 to 12 inches

Riverwash consists of very deep, excessively drained, stratified sands, gravels, and cobbles from numerous sources. This material is part of a dynamic interbraided system of bars and channels, commonly bordered by shallow to steep vertical banks cut into the alluvium. This material is not stable and is subject to shifting and sorting. It is usually dry but can be transformed into a temporary watercourse or a short-lived torrent after a heavy rain within the watershed. This material does not support vegetation because of the constant scouring and shifting it undergoes.

53—Hickiwan-Ajolito-Ajo complex, 3 to 20 percent slopes

Map Unit Setting

Landform(s): fan terraces
Elevation: 1,550 to 2,000 feet (471 to 610 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Hickiwan and similar soils: 35 percent
Ajolito and similar soils: 30 percent
Ajo and similar soils: 25 percent

Minor components: Gunsight, Pinamt, Ebon, Carrizo, Momoli, Riverwash

Soil Properties and Qualities

Hickiwan soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic, shallow

Calcic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 5 to 20 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 30 percent

woody debris: 5 percent

bare soil: 10 percent

rock fragments

gravel: 55 percent

cobble: 8 percent

Depth to restrictive feature(s): 8 to 20 inches to petrocalcic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.3 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Upland 7–10" p.z.

Ecological site number: R040XB210AZ

Present vegetation: creosotebush, triangle bursage, paloverde, saguaro, annual grasses

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 400 feet south and 400 feet east of the northwest corner of Section 11, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 6' 5.00" north, 111° 18' 3.00" west

A—0 to 2 inches (0 to 5 cm); yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4), moist; 16 percent clay; weak thick platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine vesicular pores; very few patchy faint carbonate coats on faces of peds and rock fragments; 10 percent gravel; strongly effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk—2 to 13 inches (5 to 33 cm); brown (7.5YR 5/4) very gravelly loam, brown (7.5YR 4/4), moist; 16 percent clay; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine tubular pores; common continuous prominent carbonate coats on faces of peds and rock fragments; many fine and medium carbonate masses; 40 percent gravel and 5 percent cobble; violently effervescent, 12 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkqm—13 to 60 inches (33 to 152 cm); violently effervescent; cemented material, indurated; petrocalcic.

Range in Characteristics

Rock fragments: 10 to 45 percent, averages more than 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, fine sandy loam, loam

Calcium carbonate equivalent: 2 to 10 percent

Bk horizon

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 3 to 6 moist

Chroma: 3 or 4, dry or moist

Texture: loam, sandy loam, fine sandy loam

Calcium carbonate equivalent: 5 to 25 percent

Bkqm horizon

Cemented: calcium carbonate and silica

Hardness: indurated

Thickness: 3 to 5 feet – continuous

Ajolito soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, hyperthermic, shallow

Argic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 3 to 10 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 35 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 55 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

cobble: 3 percent
Depth to restrictive feature(s): 8 to 20 inches to petrocalcic
Drainage class: well drained
Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 1.1 (very low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: very high
Hydrologic group: D
Ecological site name: Loamy Upland 7–10" p.z.
Ecological site number: R040XB213AZ
Present vegetation: creosotebush, triangle bursage, paloverde, saguaro, jumping cholla, staghorn cholla, annual grasses
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 600 feet south and 100 feet east of the northwest corner of Section 11, Township 4 S, Range 10 E
Geographic Coordinate System:
33° 6' 7.34" north, 111° 18' 1.93" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) loam, brown (7.5YR 4/4), moist; 27 percent clay; weak thin platy structure; soft, very friable, slightly sticky and moderately plastic; few very fine roots; few fine irregular pores; 10 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—2 to 12 inches (5 to 30 cm); brown (7.5YR 5/4) very gravelly clay, brown (7.5YR 4/4), moist; 40 percent clay; moderate fine and medium subangular blocky structure; slightly hard, firm, moderately sticky and moderately plastic; many very fine roots; few fine tubular pores; common continuous distinct clay films on faces of pedes and rock fragments; 45 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkm—12 to 60 inches (30 to 152 cm); violently effervescent; cemented material, indurated; petrocalcic.

Range in Characteristics

Rock fragments: 10 to 45 percent, averages more than 35 percent
Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 7.5YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 4, dry or moist
Texture: sandy loam, loam, clay loam
Calcium carbonate equivalent: 0 to 5 percent

Bt horizon

Hue: 5YR
Value: 3 to 5 dry, 3 or 4 moist

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Chroma: 3 or 4, dry or moist
Texture: clay loam, sandy clay loam, sandy clay, clay
Calcium carbonate equivalent: 0 to 10 percent

Bkm horizon

Cemented: calcium carbonate
Hardness: indurated
Thickness: 3 to 5 feet – continuous

Ajolito as used in this mapping unit is a taxadjunct to the series because it has more than 35 percent clay in the particle size control section. Ajolito series is Loamy-skeletal, mixed, superactive, hyperthermic, shallow Argic Petrocalcids.

Ajo soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Argic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 3 to 20 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent

Chemical crust

salt: 0 percent
gypsum: 0 percent

Physical cover

canopy plant cover: 35 percent
woody debris: 5 percent
bare soil: 10 percent

rock fragments

gravel: 55 percent
cobble: 5 percent

Depth to restrictive feature(s): 20 to 45 inches to petrocalcic

Drainage class: well drained

Ksat solum: 0.20 to 19.98 inches per hour (1.40 to 141.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.6 (low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: high

Hydrologic group: C

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: creosotebush, triangle bursage, paloverde, ironwood, jumping cholla, annual grasses, staghorn cholla, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 1,200 feet north and 250 feet west of the southeast corner of Section 3, Township 4 S, Range 10 E

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Geographic Coordinate System:

33° 6' 12.16" north, 111° 17' 59.17" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 19 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 10 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bt—2 to 12 inches (5 to 30 cm); reddish brown (5YR 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4), moist; 29 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine and few medium roots; few fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 20 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Btk—12 to 25 inches (30 to 64 cm); brown (7.5YR 5/4) extremely gravelly sandy clay loam, brown (7.5YR 4/4), moist; 22 percent clay; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; few fine carbonate filaments; 65 percent gravel; slightly effervescent; moderately alkaline, pH 8.0; clear wavy boundary.

Bk—25 to 40 inches (64 to 102 cm); brown (7.5YR 5/4) very gravelly loamy sand, brown (7.5YR 4/4), moist; 11 percent clay; massive; soft, very friable, nonsticky and nonplastic; few fine roots; few fine irregular pores; few continuous distinct carbonate coats on rock fragments; 50 percent gravel; strongly effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkm—40 to 60 inches (102 to 152 cm); violently effervescent; cemented material, indurated; petrocalcic.

Range in Characteristics

Rock fragments: 10 to 65 percent, averages more than 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, sandy clay loam

B horizons

Hue: 7.5YR, 5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 4 to 6 moist

Texture: sandy loam, sandy clay loam, clay loam

Calcium carbonate equivalent: 0 to 10 percent

Some pedons may have finer textures.

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 3 to 5 feet – continuous

54—Hickiwan-Gunsight complex, 1 to 15 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,480 to 2,000 feet (450 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Hickiwan and similar soils: 50 percent

Gunsight and similar soils: 40 percent

Minor components: Ajo, Ajolito, Beardsley, Laveen, Coolidge

Soil Properties and Qualities

Hickiwan soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic, shallow

Calcic Petrocalcids

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 1 to 15 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 25 percent

woody debris: 5 percent

bare soil: 10 percent

rock fragments

gravel: 75 percent

Depth to restrictive feature(s): 8 to 20 inches to petrocalcic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.2 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: high

Hydrologic group: D

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Ecological site name: Limy Upland 7–10" p.z.

Ecological site number: R040XB210AZ

Present vegetation: creosotebush, triangle bursage, paloverde, saguaro, ironwood, jumping cholla, staghorn cholla

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 2,200 feet south and 300 feet east of the northwest corner of Section 11, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 55.00" north, 111° 17' 59.00" west

A—0 to 1 inch (0 to 3 cm); pale brown (10YR 6/3) gravelly sandy loam, dark grayish brown (10YR 4/2), moist; 11 percent clay; moderate very thick platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular and common very fine irregular pores; 20 percent gravel; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bk1—1 inch to 6 inches (3 to 15 cm); pale brown (10YR 6/3) very gravelly sandy loam, dark grayish brown (10YR 4/2), moist; 11 percent clay; weak very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; few continuous distinct carbonate coats on faces of peds and rock fragments; common very fine and fine carbonate filaments; 40 percent gravel; violently effervescent, 8 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk2—6 to 11 inches (15 to 28 cm); yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 5/3), moist; 9 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; common continuous distinct carbonate coats on rock fragments; 50 percent gravel; violently effervescent, 33 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk3—11 to 17 inches (28 to 43 cm); light yellowish brown (10YR 6/4) very gravelly sandy loam, brown (10YR 4/3), moist; 13 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine, and few coarse roots; common very fine irregular and tubular pores; common continuous distinct carbonate coats on rock fragments; 55 percent gravel; violently effervescent, 13 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkm—17 to 60 inches (43 to 152 cm); cemented material, indurated; petrocalcic.

Range in Characteristics

Rock fragments: 20 to 60 percent, averages more than 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 or 6 dry, 4 or 5 moist

Chroma: 3 or 4 dry, 2 to 5 moist

Texture: sandy loam, fine sandy loam

Calcium carbonate equivalent: 2 to 10 percent

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Bk horizons

Hue: 10YR, 7.5YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry, 2 to 4 moist
Texture: sandy loam, fine sandy loam, loam
Calcium carbonate equivalent: 5 to 35 percent

Bkm horizon

Cemented: calcium carbonate
Hardness: indurated
Thickness: 3 to 5 feet – continuous

Gunsight soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 1 to 15 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent

Chemical crust

salt: 0 percent
gypsum: 0 percent

Physical cover

canopy plant cover: 25 percent
woody debris: 5 percent
bare soil: 25 percent

rock fragments

gravel: 55 percent
cobble: 5 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 4.5 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: A

Ecological site name: Limy Upland 7–10" p.z.

Ecological site number: R040XB210AZ

Present vegetation: creosotebush, paloverde, saguaro, triangle bursage

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 2,500 feet north and 800 feet east of the southwest corner of Section 11, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 57.41" north, 111° 17' 51.59" west

A—0 to 4 inches (0 to 10 cm); pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3), moist; 12 percent clay; moderate fine and medium subangular blocky

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structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 3 percent gravel; violently effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Bk1—4 to 27 inches (10 to 69 cm); pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3), moist; 10 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and few medium roots; few fine tubular pores; common continuous distinct carbonate coats on rock fragments; 50 percent gravel; violently effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—27 to 60 inches (69 to 152 cm); pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3), moist; 7 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; few fine tubular pores; common continuous distinct carbonate coats on rock fragments; 40 percent gravel and 10 percent cobble; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 6 to 8 dry, 4 or 5 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam, fine sandy loam, very fine sandy loam

Calcium carbonate equivalent: 2 to 10 percent

B horizons

Hue: 10YR, 7.5YR

Value: 6 to 8 dry, 4 or 5 moist

Chroma: 2 to 4 dry, 3 or 4 moist

Texture: sandy loam, loamy sand

Rock fragments: 45 to 70 percent

Calcium carbonate equivalent: 5 to 25 percent

Gypsum: 0 to 4 percent

55—Holguin-Rock outcrop complex, 15 to 60 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 2,410 to 4,500 feet (735 to 1,372 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 57 to 65 degrees F (13.9 to 18.3 degrees C)

Mean annual soil temperature: 59 to 67 degrees F (15.0 to 19.4 degrees C)

Frost-free period: 170 to 220 days

Major Land Resource Area: 38—Mogollon Transition

Land Resource Unit: 38—1 Lower Interior Chaparral

Map Unit Composition

Holguin and similar soils: 50 percent

Rock outcrop: 35 percent

Minor components: Mabray, Riverwash

Soil Properties and Qualities

Holguin soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Lithic Ustic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from limestone

Slope: 15 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 15 percent

 bare soil: 5 percent

rock fragments

 gravel: 15 percent

 cobble: 65 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.20 to 1.98 inches per hour (1.40 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.5 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limestone Hills 12–16" p.z.

Ecological site number: R038XA105AZ

Present vegetation: annual forbs, sideoats grama, bush muhly, perennial forbs, agave, turbinella oak, cane beardgrass, green sprangletop, pricklypear and cholla, banana yucca, sotol, canotia

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hot Tamale Peak; about 2,653 feet east and 1,139 feet south of the northwest corner of Section 18, Township 3 S, Range 14 E

Geographic Coordinate System:

33° 10' 28.80" north, 110° 57' 19.50" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 4/3) very gravelly loam, dark brown (7.5YR 3/3), moist; 25 percent clay; weak thin platy structure; soft, friable, very sticky and very plastic; many very fine and fine roots; many very fine tubular pores; 50 percent gravel; slightly effervescent, 2 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; clear smooth boundary.

Bw—3 to 15 inches (8 to 38 cm); brown (7.5YR 4/3) very cobbly clay loam, dark brown (7.5YR 3/3), moist; 33 percent clay; strong very fine and fine subangular blocky structure; soft, friable, very sticky and very plastic; many very fine and fine and common medium roots; many very fine tubular pores; 20 percent gravel and 30 percent cobble; strongly effervescent, 5 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

R—15 to 60 inches (38 to 152 cm); unweathered limestone bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 7.4 to 7.8 (slightly alkaline)

Average percent clay in the control section: 18 to 35 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 2 or 3 moist

Texture: loam, clay loam

Bw horizon

Hue: 7.5YR

Value: 3 or 4 dry or moist

Chroma: 2 to 3 dry or moist

Texture: loam, clay loam

Calcium carbonate equivalent: 0 to 10 percent

R horizon

Limestone bedrock

Holguin as used in this mapping unit is a taxadjunct to the series because this soil contains a cambic horizon. Holguin series is a Loamy-skeletal, mixed, superactive, calcareous, thermic Lithic Ustic Torriorthents.

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of limestone bedrock. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

56—Jawbone family-Rock outcrop-Chimenea complex, 15 to 80 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 2,500 to 3,800 feet (762 to 1,158 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40 -1 Upper Sonoran Desert Shrub

Map Unit Composition

Jawbone family and similar soils: 50 percent

Rock outcrop: 20 percent

Chimenea and similar soils: 15 percent

Minor components: Riverwash, soils containing more than 35 percent clay

Soil Properties and Qualities

Jawbone family soils

Taxonomic classification: Mixed, thermic, shallow Typic Torripsamments

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granodiorite

Slope: 15 to 80 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 30 percent

 bare soil: 25 percent

rock fragments

 gravel: 15 percent

 cobble: 25 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, paralithic

Drainage class: excessively drained

Ksat solum: 19.98 to 39.69 inches per hour (141.00 to 280.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.6 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Shallow Hills 10–13" p.z.

Ecological site number: R040XA105AZ

Present vegetation: purple threeawn, annual forbs, paloverde, whitethorn acacia, brittlebush, fluffgrass, perennial forbs, pricklypear and cholla, bush muhly, banana yucca, saguaro, ocotillo

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Holy Joe; about 380 feet west and 1,950 feet north of the southwest corner of Section 36, Township 6 S, Range 17 E

Geographic Coordinate System:

32° 52' 2.50" north, 110° 33' 13.10" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/3) gravelly coarse sand, brown (7.5YR 4/3), moist; 3 percent clay; weak very fine and fine granular structure; loose, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine

interstitial pores; 20 percent gravel; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bk—2 to 13 inches (5 to 33 cm); brown (7.5YR 5/3) gravelly coarse sand, brown (7.5YR 4/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and fine and few coarse roots; many very fine and fine interstitial pores; common continuous distinct carbonate coats on rock fragments; 25 percent gravel; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Crk—13 to 60 inches (33 to 152 cm); many continuous distinct carbonate coats on along fractures; weathered granodiorite bedrock.

Range in Characteristics

Rock fragments: 5 to 25 percent

Reaction: 7.4 to 8.4 (slight to moderately alkaline)

Average percent clay in the control section: 3 to 10 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: coarse sand

Bk horizon

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sand, coarse sand, loamy sand

Crk horizon

Granodiorite bedrock

Jawbone as used in this mapping unit is at the family level. The Jawbone series is moist in the soil moisture control section for less than 20 days cumulative between July and August.

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of granodiorite and other related volcanic rocks. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Chimenea soils

Taxonomic classification: Fine-loamy, mixed, superactive, thermic Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granodiorite

Slope: 15 to 80 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

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Physical cover
 canopy plant cover: 10 percent
 woody debris: 5 percent
 bare soil: 0 percent
rock fragments
 gravel: 25 percent
 cobble: 45 percent
Depth to restrictive feature(s): 20 to 40 inches to bedrock, paralithic
Drainage class: well drained
Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 5.3 (moderate)
Shrink-swell potential: about 4.5 LEP (moderate)
Flooding hazard: none
Runoff class: very high
Hydrologic group: C
Ecological site name: Shallow Hills 10–13" p.z.
Ecological site number: R040XA105AZ
Present vegetation: purple threeawn, annual forbs, paloverde, whitethorn acacia, brittlebush, fluffgrass, perennial forbs, pricklypear and cholla, bush muhly, banana yucca, saguaro, ocotillo
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Holy Joe; about 400 feet west and 2,000 feet north of the southwest corner of Section 36, Township 6 S, Range 17 E
Geographic Coordinate System:
32° 52' 3.40" north, 110° 33' 14.30" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/4) gravelly sandy loam, dark brown (7.5YR 3/4), moist; 14 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few coarse roots; many very fine interstitial pores; 15 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt—2 to 11 inches (5 to 28 cm); reddish brown (5YR 4/4) sandy clay loam, reddish brown (5YR 4/4), moist; 27 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, very sticky and very plastic; common very fine roots; many very fine tubular and interstitial pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.8; clear wavy boundary.

Btk1—11 to 22 inches (28 to 56 cm); reddish brown (5YR 4/4) sandy clay loam, reddish brown (5YR 4/4), moist; 27 percent clay; strong fine and medium subangular blocky structure; slightly hard, firm, very sticky and very plastic; common very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common continuous distinct carbonate coats on faces of peds; 5 percent gravel; strongly effervescent; neutral, pH 7.2; abrupt wavy boundary.

Btk2—22 to 32 inches (56 to 81 cm); reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4), moist; 27 percent clay; strong very fine and fine subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots;

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many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common continuous distinct carbonate coats on faces of peds; 5 percent gravel; strongly effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Crt—32 to 60 inches (81 to 152 cm); many continuous distinct clay films along fractures; weathered granodiorite bedrock.

Range in Characteristics

Rock fragments: 5 to 15 percent

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 5YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: loamy sand, sandy loam, sandy clay loam

Reaction: 6.6 to 7.3 (neutral)

Bt horizon

Hue: 5YR, 7.5YR

Value: 4 or 5 dry, 3 to 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy clay loam

Reaction: 6.6 to 7.3 (neutral)

Btk horizon

Hue: 5YR, 7.5YR

Value: 4 or 5 dry, 3 to 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy clay loam

Reaction: 6.6 to 8.4 (neutral to moderately alkaline)

Crt horizon

Granodiorite bedrock

Chimenea series as used in this map unit is a taxadjunct to the series because the family classification is fine-loamy and moderately deep to bedrock. Chimenea series is loamy, mixed, superactive, thermic shallow Typic Haplargids.

57—Kimrose-Sasabe complex, 3 to 45 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 3,700 to 4,890 feet (1,129 to 1,490 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Kimrose and similar soils: 40 percent

Sasabe and similar soils: 30 percent

Minor components: Tombstone and soils that contain more than 35 percent clay and rock fragments, soils clayey and shallow to hardpan.

Soil Properties and Qualities

Kimrose soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 3 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 50 percent

 cobble: 10 percent

Depth to restrictive feature(s): 7 to 20 inches to petrocalcic

Drainage class: well drained

Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.1 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Upland 12–16" p.z.

Ecological site number: R041XC309AZ

Present vegetation: whitethorn, ocotillo, black grama, perennial forbs, annual forbs, bush muhly, Lehmann's love grass, fluffgrass, pricklypear and cholla, tanglehead

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Campo Bonito; about 2,400 feet south and 2,000 feet west of the northeast corner of Section 35, Township 10 S, Range 16 E

Geographic Coordinate System:

32° 31' 17.40" north, 110° 40' 39.50" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/3) very gravelly sandy loam, dark brown (7.5YR 3/3), moist; 18 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many fine irregular pores; 45 percent gravel and 10 percent cobble; violently

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effervescent, 15 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Bk—2 to 13 inches (5 to 33 cm); brown (7.5YR 5/3) very gravelly loam, dark brown (7.5YR 3/3), moist; 24 percent clay; moderate very fine and fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and few medium roots; many fine irregular pores; many continuous distinct carbonate coats on rock fragments; 45 percent gravel and 10 percent cobble; violently effervescent, 18 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bkm—13 to 60 inches (33 to 152 cm); cemented material, indurated; petrocalcic.

Range in Characteristics

Rock fragments: 40 to 70 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 18 to 35 percent

Calcium carbonate equivalent: 15 to 25 percent

A horizon

Hue: 10YR, 7.5YR

Value: 3 to 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist

Texture: sandy loam, loam

Bk horizons

Hue: 10YR, 7.5YR

Value: 3 to 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist

Texture: sandy loam, loam

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 5 feet; continuous

Sasabe soils

Taxonomic classification: Fine, mixed, superactive, thermic Ustic Paleargids

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 3 to 20 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 5 percent

bare soil: 30 percent

rock fragments

gravel: 35 percent

cobble: 15 percent

Drainage class: well drained

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Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

Available water capacity total inches: 4.9 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Loamy Upland 12–16" p.z.

Ecological site number: R041XC313AZ

Present vegetation: mesquite, curly mesquite, pricklypear and cholla, perennial forbs, annual forbs, false mesquite, sand dropseed

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Campo Bonito; about 1,850 feet east and 175 feet north of the southwest corner of Section 35, Township 10 S, Range 16 E

Geographic Coordinate System:

32° 30' 50.90" north, 110° 40' 55.40" west

A—0 to 2 inches (0 to 5 cm); strong brown (7.5YR 4/6) gravelly loam, dark brown (7.5YR 3/3), moist; 24 percent clay; moderate fine and medium platy parting to weak very fine subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; many fine irregular pores; 20 percent gravel; noneffervescent; moderately acid, pH 6.0; abrupt smooth boundary.

Bt1—2 to 20 inches (5 to 51 cm); dark reddish brown (2.5YR 3/3) clay, dark reddish brown (2.5YR 3/3), moist; 60 percent clay; strong medium and coarse angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few very fine and few medium roots; many very fine and fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common distinct pressure faces; 5 percent gravel; noneffervescent; neutral, pH 7.2; abrupt wavy boundary.

Bt2—20 to 60 inches (51 to 152 cm); reddish brown (5YR 4/4) extremely cobbly clay, reddish brown (5YR 4/4), moist; 55 percent clay; strong fine and medium angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few very fine roots; many very fine and fine tubular pores; many continuous distinct clay filmson faces of peds and rock fragments; common distinct pressure faces; 15 percent gravel and 45 percent cobble; noneffervescent; neutral, pH 7.2.

Range in Characteristics

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 10YR, 7.5YR

Value: 3 or 4 dry or moist

Chroma: 4 to 6 dry, or 3 or 4 moist

Texture: sandy loam, loam

Reaction: 5.6 to 6.5 (slightly to moderately acid)

Bt horizons

Hue: 5YR, 2.5YR

Value: 3 or 4 dry or moist

Chroma: 3 or 4, dry or moist

Texture: clay loam, clay

Rock fragments: 5 to 60 percent, averages less than 35 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

58—Lanque family-Turquoise complex, 1 to 20 percent slopes

Map Unit Setting

Landform(s): Lanque family – alluvial fans; Turquoise – hills

Elevation: 3,800 to 4,400 feet (1,158 to 1,341 meters)

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

Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)

Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)

Frost-free period: 160 to 210 days

Major Land Resource Area: 41–Southeastern Arizona Basin and Range

Land Resource Unit: 41–1 Mexican Oak-Pine Woodland and Oak Savannah

Map Unit Composition

Lanque family and similar soils: 60 percent

Turquoise and similar soils: 30 percent

Minor components: Nugget, soils that have more than 35 percent rock fragments,
Riverwash

Soil Properties and Qualities

Lanque family soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Pachic
Haplustolls

Geomorphic position: proximal and distal

Parent material: mixed fan alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 80 percent

 boulder: 10 percent

Depth to restrictive feature(s): 40 to 60 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 3.8 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: B

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Ecological site name: Sandy Loam Upland 16–20" p.z.

Ecological site number: R041XA110AZ

Present vegetation: mesquite, needle grama, annual forbs, annual grasses, catclaw acacia, pricklypear and cholla, spidergrass, burroweed, graythorn, jumping cholla

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Mountain; about 200 feet east and 1,250 feet south of the northwest corner of Section 12, Township 8 S, Range 13 E

Geographic Coordinate System:

32° 45' 17.00" north, 110° 57' 49.00" west

A—0 to 2 inches (0 to 5 cm); dark brown (10YR 3/3) sandy loam, very dark brown (10YR 2/2), moist; 13 percent clay; moderate thin and medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine vesicular pores; 10 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

C1—2 to 26 inches (5 to 66 cm); dark brown (10YR 3/3) gravelly sandy loam, very dark brown (10YR 2/2), moist; 17 percent clay; moderate medium and coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few medium roots; common very fine vesicular pores; 20 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

C2—26 to 42 inches (66 to 107 cm); dark brown (10YR 3/3) gravelly sandy loam, very dark brown (10YR 2/2), moist; 20 percent clay; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and few coarse roots; common very fine vesicular pores; 25 percent gravel; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

Cr—42 to 60 inches (107 to 152 cm); weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 10 to 35 percent

Organic matter: 1 to 3 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 3 to 15 percent

A and C horizons

Hue: 10YR

Value: 3 dry, 2 moist

Chroma: 3 dry, 2 moist

Texture: sandy loam, coarse sandy loam

Cr horizon

Granite and granodiorite bedrock

Lanque as used in this mapping unit is at the family level. This soil has soft and hard granite and granodiorite bedrock below 40 inches.

Turquoise soils

Taxonomic classification: Loamy, mixed, superactive, thermic, shallow Aridic Haplustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 1 to 20 percent

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Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 30 percent

woody debris: 5 percent

bare soil: 10 percent

rock fragments

gravel: 80 percent

boulder: 20 percent

Depth to restrictive feature(s): 8 to 20 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.6 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: high

Hydrologic group: C

Ecological site name: Granitic Hills 16–20" p.z.

Ecological site number: R041XA102AZ

Present vegetation: turbinella oak, banana yucca, burrobush, manzanita, pinyon, sumac, mountain mahogany, silk tassel, juniper, mimosa

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Mountain; about 350 feet east and 1,400 feet south of the northwest corner of Section 12, Township 8 S, Range 13 E

Geographic Coordinate System:

32° 45' 17.00" north, 110° 57' 48.00" west

A1—0 to 1 inch (0 to 3 cm); dark brown (10YR 3/3) sandy loam, very dark brown (10YR 2/2), moist; 13 percent clay; weak thin platy structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine vesicular pores; 10 percent gravel; noneffervescent; neutral, pH 7.2; abrupt smooth boundary.

A2—1 inch to 15 inches (3 to 38 cm); dark brown (10YR 3/3) sandy loam, black (10YR 2/1), moist; 15 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine vesicular pores; 5 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Cr—15 to 60 inches (38 to 152 cm); weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 0 to 20 percent

Organic matter: 1 to 3 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 5 to 18 percent

A horizons

Hue: 10YR
Value: 3 dry, 2 moist
Chroma: 3 dry, 1 or 2 moist
Texture: sandy loam, coarse sandy loam

Cr horizon

Granite and granodiorite bedrock

Turquoise, as used in this mapping unit, is a taxadjunct to the series because it contains a mollic epipedon. Turquoise is Loamy, mixed, superactive, nonacid, thermic, shallow Aridic Ustorthents.

59—Laveen fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

Landform(s): fan terraces, stream terraces
Elevation: 1,500 to 2,000 feet (457 to 610 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Laveen and similar soils: 85 percent

Minor components: Mohall, Coolidge, Gilman, Denure, Central Arizona Project Canal, landfills

Soil Properties and Qualities

Laveen soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan and stream alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 5 percent

woody debris: 5 percent

bare soil: 90 percent (farm field)

rock fragments

gravel: 5 percent

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Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 9.1 (high)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: B

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: creosotebush, big galleta, bush muhly, triangle bursage, white ratany

Land capability (irrigated): 2s

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 1,200 feet south and 1,950 feet west of the northeast corner of Section 12, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 6' 0.00" north, 111° 16' 17.00" west

Ap1—0 to 4 inches (0 to 10 cm); light brown (7.5YR 6/4) fine sandy loam, brown (7.5YR 5/4), moist; 8 percent clay; moderate coarse cloddy and moderate fine and medium cloddy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few fine irregular pores; violently effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Ap2—4 to 13 inches (10 to 33 cm); light brown (7.5YR 6/4) fine sandy loam, brown (7.5YR 5/4), moist; 12 percent clay; moderate fine and medium cloddy structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine roots; few fine tubular pores; common fine and medium carbonate masses; violently effervescent, 10 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk1—13 to 37 inches (33 to 94 cm); pink (7.5YR 7/3) loam, brown (7.5YR 5/4), moist; 12 percent clay; massive; soft, very friable, slightly sticky and moderately plastic; common fine roots; many fine tubular pores; many continuous distinct carbonate coats lining pores; many fine and medium carbonate filaments and masses; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; clear smooth boundary.

Bk2—37 to 60 inches (94 to 152 cm); light brown (7.5YR 6/4) loam, brown (7.5YR 4/4), moist; 15 percent clay; massive; slightly hard, very friable, slightly sticky and moderately plastic; few very fine roots; many fine tubular pores; common fine carbonate filaments; 5 percent gravel; violently effervescent, 11 percent calcium carbonate equivalent; moderately alkaline, pH 8.2.

Range in Characteristics

Average percent clay in the control section: 10 to 20 percent

EC (mmhos/cm): 0 to 8 (none to slightly saline)

SAR: 1 to 13 (slightly sodic)

A horizon

Hue: 10YR, 7.5YR

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Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4, dry or moist
Texture: fine sandy loam, sandy loam, loam
Reaction: 7.9 to 8.4 (moderately alkaline)
Calcium carbonate equivalent: 5 to 15 percent

B horizons

Hue: 10YR, 7.5YR
Value: 5 to 7 dry, 3 to 5 moist
Chroma: 3 or 4, dry or moist
Texture: very fine sandy loam, fine sandy loam, loam, sandy loam
Reaction: 7.9 to 9.0 (moderately to strongly alkaline)
Calcium carbonate equivalent: 5 to 20 percent

Some pedons have clay loam textures below 40 inches.

60—Laveen loam, 0 to 3 percent slopes

Map Unit Setting

Landform(s): fan terraces
Elevation: 1,650 to 2,000 feet (502 to 610 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Laveen and similar soils: 80 percent

Minor components: Mohall, Denure, Carrizo, Hicciwan, Pinamt, Gunsight, Beardsley

Soil Properties and Qualities

Laveen soils

Taxonomic classification: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 25 percent

 woody debris: 10 percent

 bare soil: 60 percent

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rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 9.6 (high)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: B

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: creosotebush, paloverde, triangle bursage

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 450 feet south and 550 feet east of the northwest corner of Section 28, Township 3 S, Range 10 E

Geographic Coordinate System:

33° 9' 10.00" north, 111° 20' 0.00" west

A—0 to 15 inches (0 to 38 cm); pale brown (10YR 6/3) loam, brown (10YR 4/3), moist; 12 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; few fine tubular pores; 5 percent gravel; strongly effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bw—15 to 42 inches (38 to 107 cm); light brown (7.5YR 6/4) loam, brown (7.5YR 4/4), moist; 15 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; few very fine tubular pores; strongly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk—42 to 60 inches (107 to 152 cm); light brown (7.5YR 6/4) loam, brown (7.5YR 5/4), moist; 15 percent clay; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; many fine carbonate filaments; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 0 to 10 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 10 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 3 to 6 moist

Chroma: 2 to 6, dry or moist

Texture: sandy loam, loam

Calcium carbonate equivalent: 2 to 15 percent

B horizons

Hue: 10YR, 7.5YR

Value: 5 to 8 dry, 3 to 7 moist

Chroma: 2 to 6, dry or moist

Texture: loam, sandy loam, fine sandy loam

Calcium carbonate equivalent: 5 to 25 percent

61—Lehmans-Rock outcrop complex, 8 to 50 percent slopes

Map Unit Setting

Landform(s): hills

Elevation: 2,790 to 3,390 feet (851 to 1,034 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Lehmans and similar soils: 60 percent

Rock outcrop: 30 percent

Minor components: Lehmans soils that have fewer rock fragments and less clay

Soil Properties and Qualities

Lehmans soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic Lithic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from andesite

Slope: 8 to 50 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 5 percent

 bare soil: 35 percent

rock fragments

 gravel: 50 percent

 cobble: 20 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 0.9 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 10-13" p.z.

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Ecological site number: R040XA123AZ

Present vegetation: annual forbs, saguaro, paloverde, triangle bursage, pricklypear and cholla, purple threeawn, annual grasses, ocotillo

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Desert Peak; about 1,700 feet east and 750 feet north of the southwest corner of Section 32, Township 9 S, Range 12 E

Geographic Coordinate System:

32° 35' 58.00" north, 111° 7' 51.00" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 4/4) very gravelly sandy loam, dark brown (7.5YR 3/3), moist; 19 percent clay; moderate very fine and fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine roots; common very fine irregular pores; 50 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt—3 to 12 inches (8 to 30 cm); reddish brown (2.5YR 4/3) very gravelly clay, dark reddish brown (2.5YR 3/4), moist; 52 percent clay; strong fine and medium angular blocky structure; hard, very firm, very sticky and very plastic; common very fine and few coarse roots; common very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 50 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

R—12 to 60 inches (30 to 152 cm); unweathered andesite bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 35 to 55 percent

A horizon

Hue: 7.5YR, 2.5YR

Value: 4 dry, 3 moist

Chroma: 3 or 4 dry, 3 moist

Texture: sandy loam, sandy clay loam

Bt horizons

Hue: 2.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 4 moist

Texture: clay, clay loam, sandy clay

R horizon

Andesite and dacite bedrock

Lehmans as used in this mapping unit is a taxadjunct to the series because it has more than 35 percent rock fragments and has mixed mineralogy. Lehmans series is a Clayey, smectic, thermic Lithic Haplargids.

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings, boulder piles, and vertical buttes of andesite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the summits.

62—Mabray-Rock outcrop complex, 20 to 75 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 3,400 to 4,400 feet (1,036 to 1,341 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Mabray and similar soils: 50 percent

Rock outcrop: 35 percent

Minor components: Tombstone, limy shallow argillic, deep yellow (2.5Y 8/8 and 7/6) clay loam soils

Soil Properties and Qualities

Mabray soils

Taxonomic classification: Loamy-skeletal, carbonatic, thermic Lithic Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from limestone

Slope: 20 to 75 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 60 percent

 cobble: 10 percent

Depth to restrictive feature(s): 8 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.57 to 1.98 inches per hour (4.00 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.3 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site name: Limestone Hills 12–16" p.z.

Ecological site number: R041XC307AZ

Present vegetation: false mesquite, banana yucca, black grama, sideoats grama, bush muhly, jojoba, range ratany, ratear coldenia, sotol, pricklypear and cholla

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Brandenburg Mountain; about 1,700 east and 700 feet south of the northwest corner of Section 21, Township 6 S, Range 17 E

Geographic Coordinate System:

32° 54' 1.00" north, 110° 36' 53.00" west

A—0 to 1 inch (0 to 3 cm); brown (10YR 5/3) very gravelly loam, brown (10YR 4/3), moist; 21 percent clay; weak thin platy structure; soft, very friable, nonsticky and slightly plastic; few very fine roots; few fine irregular pores; 40 percent gravel; violently effervescent, 52 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; clear smooth boundary.

Ck1—1 inch to 8 inches (3 to 20 cm); brown (10YR 5/3) very gravelly loam, dark yellowish brown (10YR 4/4), moist; 23 percent clay; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; few fine tubular pores; common continuous distinct carbonate coats on rock fragments; 40 percent gravel; violently effervescent, 54 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Ck2—8 to 14 inches (20 to 36 cm); brown (10YR 5/3) very gravelly loam, brown (10YR 4/3), moist; 23 percent clay; massive; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; few fine tubular pores; common continuous distinct carbonate coats on rock fragments; 35 percent gravel and 10 percent cobble; violently effervescent, 58 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

R—14 to 60 inches (36 to 152 cm); unweathered limestone bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 18 to 25 percent

Calcium carbonate equivalent: 40 to 60 percent

A and C horizons

Hue: 10YR

Value: 5 or 6 dry, 3 to 5 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam, loam

Some pedons have a thin pan above the bedrock.

R horizon

Limestone bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of limestone. Rock outcrop also includes areas where the depth to bedrock is less than four inches.

63—Maripo sandy loam, 0 to 3 percent slopes

Map Unit Setting

Landform(s): alluvial fans

Elevation: 1,650 to 2,000 feet (502 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Maripo and similar soils: 80 percent

Minor components: Carrizo, Denure, Dateland, Momoli

Soil Properties and Qualities

Maripo soils

Taxonomic classification: Coarse-loamy, mixed, superactive, calcareous, hyperthermic Typic Torrifuvents

Geomorphic position: proximal and distal

Parent material: mixed fan alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 25 percent

rock fragments

 gravel: 40 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 2.9 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: rare

Runoff class: very low

Hydrologic group: A

Ecological site name: Sandy Loam Upland 7–10" p.z.

Ecological site number: R040XB218AZ

Present vegetation: ironwood, jumping cholla, paloverde

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 500 feet south and

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2,500 feet west of the northeast corner of Section 10, Township 3 S,
Range 10 E

Geographic Coordinate System:

33° 11' 26.00" north, 111° 17' 7.00" west

A—0 to 12 inches (0 to 30 cm); brown (10YR 5/3) sandy loam, brown (10YR 4/3), moist; 12 percent clay; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common fine interstitial pores; 5 percent gravel; slightly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

C—12 to 26 inches (30 to 66 cm); pale brown (10YR 6/3) stratified sandy loam, brown (10YR 4/3), moist; 12 percent clay; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few fine interstitial pores; 5 percent gravel; slightly effervescent; moderately alkaline, pH 8.2; clear smooth boundary.

2C—26 to 60 inches (66 to 152 cm); brown (10YR 5/3) stratified very gravelly sand, brown (10YR 4/3), moist; 5 percent clay; single grain; loose, nonsticky and nonplastic; few very fine roots; few fine interstitial pores; 50 percent gravel; slightly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 5 to 20 percent in the upper part and 1 to 10 percent in the lower part

Calcium carbonate equivalent: 0 to 2 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 3 or 4 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam, fine sandy loam, loamy sand

C horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 3 or 4 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam, fine sandy loam, loamy sand

Rock fragments: 0 to 25 percent

2C horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sand, coarse sand

Rock fragments: 5 to 60 percent

64—Mined Land

Mined lands are areas where copper, gravel, sand, or gypsum has been mined. These areas include the actual mines, shafts, structures, borrow pits, tailings, excavations, product storage, waste rock piles, evaporation ponds, and disturbed areas. It includes exposed copper ore ready for mining and piles of lower grade ore used in leaching operations. This unit also includes open excavations from which soils and geological material have been removed for use in copper, sand, and gravel, or gypsum production. This unit describes all areas affected by active or past mining activities.

This material does not support vegetation because the topsoil has been removed. This unit has little or no value or potential for irrigated cropland, rangeland, or urban land development. Abandoned areas have moderate potential for wildlife habitat and rangeland, if they are restored and reseeded with vegetation. This unit is not placed in a capability classification because it is a miscellaneous landform.

Active and inactive copper mines and smelters are located in the vicinity of Hayden, Winkelman, Mammoth, and San Manuel, Arizona.

Active and inactive sand and gravel operations are in the vicinity south of San Manuel, Arizona, and west of the Ashurst-Hayden Dam outside Florence, Arizona.

Active and inactive gypsum mines are located in the vicinity of Dudleyville and Mammoth, Arizona.

65—Mohall clay loam, 0 to 5 percent slopes

Map Unit Setting

Landform(s): basin floors, fan terraces

Elevation: 1,440 to 2,000 feet (438 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Mohall and similar soils: 85 percent

Minor components: Contine, Riverwash, soils that have calcic horizons below 40",
Central Arizona Project Canal

Soil Properties and Qualities

Mohall soils

Taxonomic classification: Fine-loamy, mixed, superactive, hyperthermic Typic
Calciargids

Geomorphic position: drainageways and summits

Parent material: mixed fan alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 55 percent

 woody debris: 15 percent

 bare soil: 30 percent

rock fragments: 0 percent

Drainage class: well drained

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Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 10.3 (very high)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: rare

Runoff class: medium

Hydrologic group: B

Ecological site name: Loamy Swale 7–10" p.z.

Ecological site number: R040XB211AZ

Present vegetation: mesquite, catclaw acacia, annual grasses

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence; about 1,200 feet north and 2,400 feet east of the southwest corner of Section 35, Township 3 S, Range 9 E

Geographic Coordinate System:

33° 7' 20.00" north, 111° 24' 10.00" west

A—0 to 2 inches (0 to 5 cm); pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4), moist; 27 percent clay; moderate medium platy structure; soft, very friable, very sticky and moderately plastic; common very fine roots; common fine interstitial pores; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—2 to 19 inches (5 to 48 cm); brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4), moist; 30 percent clay; moderate fine and medium subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; common very fine and few medium roots; common fine tubular pores; common continuous distinct clay films on faces of peds; noneffervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Btk1—19 to 32 inches (48 to 81 cm); brown (7.5YR 5/4) sandy clay loam, brown (7.5YR 4/4), moist; 26 percent clay; moderate medium and coarse subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; common very fine and few medium roots; common fine tubular pores; many continuous prominent clay films on faces of peds; few fine carbonate filaments; 5 percent gravel; strongly effervescent, 6 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Btk2—32 to 48 inches (81 to 122 cm); light brown (7.5YR 6/3) loam, brown (7.5YR 5/4), moist; 24 percent clay; strong very fine and fine and medium subangular blocky structure; hard, friable, slightly sticky and very plastic; few very fine and fine roots; few fine tubular pores; many continuous prominent clay films on faces of peds; many continuous distinct carbonate coats on faces of peds; many fine carbonate filaments and common fine carbonate masses; 5 percent gravel; violently effervescent, 30 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear wavy boundary.

Btk3—48 to 60 inches (122 to 152 cm); pinkish gray (7.5YR 7/2) loam, light brown (7.5YR 6/4), moist; 15 percent clay; strong fine and medium subangular blocky structure; hard, friable, moderately sticky and slightly plastic; few medium and coarse roots; few fine tubular pores; common continuous distinct clay films on faces of peds; many continuous distinct carbonate coats on faces of peds; many fine and medium carbonate masses; 5 percent gravel; violently effervescent, 30 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR, 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4, dry or moist
Texture: clay loam, loam, silty clay loam

Bt horizon

Hue: 7.5YR, 5YR
Value: 5 dry, 3 or 4 moist
Chroma: 4 dry, 3 or 4 moist
Texture: clay loam, loam, sandy clay loam
Calcium carbonate equivalent: 0 to 5 percent

Btk horizons

Hue: 7.5YR, 5YR
Value: 5 to 7 dry, 3 to 6 moist
Chroma: 2 to 6 dry, 4 moist
Texture: clay loam, sandy clay loam, loam
Rock fragments: 0 to 10 percent
Calcium carbonate equivalent: 5 to 40 percent

This unit receives run-on moisture from adjacent areas. Concentration of water flow can cause severe erosion in the form of piping, head cutting, and gully erosion.

66—Mohall sandy loam, 0 to 3 percent slopes

Map Unit Setting

Landform(s): basin floors, fan terraces
Elevation: 1,440 to 2,000 feet (438 to 610 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Mohall and similar soils: 90 percent

Minor components: Denure, Central Arizona Project Canal, soils that have hard pans deeper than 20 inches

Soil Properties and Qualities

Mohall soils

Taxonomic classification: Fine-loamy, mixed, superactive, hyperthermic Typic Calciargids
Geomorphic position: drainageways and summits
Parent material: mixed fan alluvium
Slope: 0 to 3 percent

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Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 50 percent

woody debris: 5 percent

bare soil: 25 percent

rock fragments

gravel: 20 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 10.6 (very high)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: low

Hydrologic group: B

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: triangle bursage, creosotebush, mesquite, barrel cactus, annual grasses

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Magma; about 400 feet south and 500 feet west of the northeast corner of Section 16, Township 3 S, Range 9 E

Geographic Coordinate System:

33° 10' 42.00" north, 111° 25' 56.00" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 17 percent clay; strong medium and thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few fine interstitial pores; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt1—3 to 15 inches (8 to 38 cm); yellowish red (5YR 4/6) sandy clay loam, reddish brown (5YR 4/4), moist; 24 percent clay; strong fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine roots; common fine tubular pores; common continuous prominent clay films on faces of peds; noneffervescent; moderately alkaline, pH 8.0; clear smooth boundary.

Bt2—15 to 30 inches (38 to 76 cm); yellowish red (5YR 4/6) sandy clay loam, reddish brown (5YR 4/4), moist; 27 percent clay; strong medium and coarse subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common fine tubular pores; common continuous prominent clay films on faces of peds; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Btk—30 to 60 inches (76 to 152 cm); yellowish red (5YR 4/6) clay loam, reddish brown (5YR 5/4), moist; 32 percent clay; strong fine and medium subangular blocky structure; hard, firm, moderately sticky and very plastic; common fine tubular pores;

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common continuous prominent clay films on faces of peds; many fine carbonate filaments and fine and medium carbonate masses; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 5 or 6 dry, 4 moist

Chroma: 4 to 6 dry, 4 moist

Texture: sandy loam, fine sandy loam, loam

Bt horizons

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: clay loam, sandy clay loam, loam

Calcium carbonate equivalent: 0 to 25 percent

Btk horizon

Hue: 7.5YR, 5YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy clay loam, clay loam, loam,

Rock fragments: 0 to 25 percent

Calcium carbonate equivalent: 15 to 30 percent

67—Mohall-Contine complex, 0 to 5 percent slopes

Map Unit Setting

Landform(s): basin floors

Elevation: 1,490 to 2,090 feet (454 to 636 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Mohall and similar soils: 60 percent

Contine and similar soils: 30 percent

Minor components: Glenbar, Denure, Gadsden

Soil Properties and Qualities

Mohall soils

Taxonomic classification: Fine-loamy, mixed, superactive, hyperthermic Typic Haplargids

Geomorphic position: drainageways

Parent material: mixed fan alluvium

Slope: 0 to 5 percent

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Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 10 percent

bare soil: 80 percent

rock fragments

gravel: 5 percent

Drainage class: well drained

Ksat solum: 0.20 to 1.98 inches per hour (1.40 to 14.00 micrometers per second)

Available water capacity total inches: 10.9 (very high)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: occasional

Runoff class: low

Hydrologic group: B

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: annual forbs, mesquite, annual grasses, creosotebush

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Picacho Pass; about 650 feet east and 1,850 feet north of the southwest corner of Section 21, Township 8 S, Range 10 E

Geographic Coordinate System:

32° 42' 37.10" north, 111° 19' 37.80" west

A—0 to 3 inches (0 to 8 cm); yellowish brown (10YR 5/4) silt loam, brown (7.5YR 4/3), moist; 20 percent clay; weak thin and medium platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine vesicular and common fine interstitial pores; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

AC—3 to 12 inches (8 to 30 cm); dark yellowish brown (10YR 4/6) silt loam, brown (7.5YR 4/3), moist; 20 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; common fine interstitial pores; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—12 to 32 inches (30 to 81 cm); strong brown (7.5YR 4/6) clay loam, brown (7.5YR 4/4), moist; 30 percent clay; moderate fine and medium subangular blocky structure; slightly hard, firm, moderately sticky and very plastic; few very fine roots; many fine tubular pores; common continuous distinct clay films on faces of peds; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Btk1—32 to 48 inches (81 to 122 cm); strong brown (7.5YR 4/6) clay loam, brown (7.5YR 4/4), moist; 30 percent clay; strong fine and medium subangular blocky structure; moderately hard, firm, moderately sticky and very plastic; few very fine and fine roots; many very fine tubular pores; many continuous distinct clay films on faces

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of peds; many fine carbonate filaments; violently effervescent, 8 percent calcium carbonate equivalent; moderately alkaline, pH 8.4; clear smooth boundary.

Btk2—48 to 60 inches (122 to 152 cm); brown (7.5YR 5/4) loam, brown (7.5YR 4/4), moist; 20 percent clay; strong fine and medium subangular blocky structure; very hard, very firm, moderately sticky and very plastic; few very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds; many fine carbonate filaments; violently effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.4.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A and AC horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: silt loam, loam, silty clay loam

Bt horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 6 dry or moist

Texture: clay loam, loam, sandy clay loam

Calcium carbonate equivalent: 0 to 2 percent

Btk horizons

Hue: 7.5YR, 5YR

Value: 4 to 6 dry, 3 to 6 moist

Chroma: 2 to 6 dry, 3 or 4 moist

Texture: clay loam, sandy clay loam, loam

Calcium carbonate equivalent: 5 to 14 percent

Mohall as used in this mapping unit is a taxadjunct to the series because it does not contain a calcic horizon. Mohall series is a Fine-loamy, mixed, superactive, hyperthermic Typic Calciargids.

This unit receives run-on moisture from adjacent areas. Concentration of water flow can cause severe erosion in the form of piping, head cutting and gully erosion.

Contine soils

Taxonomic classification: Fine, mixed, superactive, hyperthermic Vertic Calciargids

Geomorphic position: drainageways

Parent material: mixed fan alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 10 percent

bare soil: 50 percent

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rock fragments

gravel: 5 percent

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Available water capacity total inches: 9.0 (high)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: occasional

Runoff class: medium

Hydrologic group: C

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: creosotebush, annual grasses, mesquite, annual forbs

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Picacho Pass; about 500 feet east and 750 feet north of the southwest corner of Section 21, Township 8 S, Range 10 E

Geographic Coordinate System:

32° 42' 44.40" north, 111° 19' 40.10" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/4) clay loam, brown (7.5YR 4/3), moist; 32 percent clay; strong medium and thick platy structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; many very fine vesicular and tubular pores; noneffervescent; slightly alkaline, pH 7.4; clear wavy boundary.

Bt—1 inch to 12 inches (3 to 30 cm); brown (7.5YR 4/4) clay, dark brown (7.5YR 3/3), moist; 50 percent clay; strong medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; many very fine roots; common very fine tubular pores; many continuous distinct clay films on faces of peds; noneffervescent; slightly alkaline, pH 7.6; gradual wavy boundary.

Btk1—12 to 20 inches (30 to 51 cm); brown (7.5YR 5/4) clay, brown (7.5YR 4/3), moist; 50 percent clay; strong coarse and very coarse angular blocky structure; very hard, firm, very sticky and very plastic; common very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds; few continuous distinct carbonate coats along root channels; violently effervescent, 13 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; gradual wavy boundary.

Btk2—20 to 60 inches (51 to 152 cm); 50 percent brown (7.5YR 4/3) and 50 percent light brown (7.5YR 6/4) clay, brown (7.5YR 4/4), moist; 50 percent clay; moderate fine and medium subangular blocky structure; slightly hard, firm, very sticky and very plastic; few very fine roots; common fine tubular pores; few continuous distinct carbonate coats along root channels; common fine and medium carbonate masses few fine manganese coatings on faces of peds; violently effervescent, 28 percent calcium carbonate equivalent; moderately alkaline, pH 8.4.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 35 to 55 percent

A horizon

Hue: 7.5YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: clay loam, loam, sandy clay loam

Bt horizon

Hue: 5YR, 7.5YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 4 to 6 dry, 3 or 4 moist
Texture: clay loam, clay

Btk horizons

Hue: 5YR, 7.5YR
Value: 4 to 6 dry, 4 or 5 moist
Chroma: 3 to 6 dry or moist
Texture: clay loam, clay
Calcium carbonate equivalent: 10 to 35 percent

This unit receives run-on moisture from adjacent areas. Concentration of water flow can cause severe erosion in the form of piping, head cutting and gully erosion.

68—Momoli-Carrizo family complex, 1 to 8 percent slopes

Map Unit Setting

Landform(s): Momoli – fan terraces and stream terraces; Carrizo family – flood plains
Elevation: 1,650 to 2,000 feet (502 to 610 meters)
Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)
Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)
Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)
Frost-free period: 240 to 325 days
Major Land Resource Area: 40–Sonoran Basin and Range
Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Momoli and similar soils: 70 percent
Carrizo family and similar soils: 20 percent
Minor components: Gunsight, Tremant, soils that have hard pans at moderate to very deep depths

Soil Properties and Qualities

Momoli soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocambids
Geomorphic position: generally on summits and backslopes
Parent material: mixed fan alluvium
Slope: 1 to 8 percent
Surface cover:
Biological crust
cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 40 percent
woody debris: 5 percent
bare soil: 10 percent

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rock fragments

gravel: 50 percent

cobble: 5 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 4.3 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: A

Ecological site name: Sandy Upland 7–10" p.z.

Ecological site number: R040XB217AZ

Present vegetation: jumping cholla, creosotebush, mesquite, triangle bursage, wolfberry, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 1,000 feet north and 1,700 feet east of the southwest corner of Section 23, Township 3 S, Range 10 E

Geographic Coordinate System:

33° 9' 10.00" north, 111° 17' 40.00" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; weak medium platy structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine irregular pores; 30 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bw—3 to 28 inches (8 to 71 cm); brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/4), moist; 16 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and medium roots; few fine tubular pores; 30 percent gravel and 15 percent cobble; noneffervescent; slightly alkaline, pH 7.6; clear smooth boundary.

Bk—28 to 60 inches (71 to 152 cm); light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 5/4), moist; 12 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine tubular pores; very few patchy faint carbonate coats on bottom surfaces of rock fragments; 40 percent gravel and 5 percent cobble; slightly effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: 35 to 75 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 to 6, dry or moist

B horizons

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 4 or 5 moist

Chroma: 3 to 6 dry, 4 to 6 moist

Texture: sandy loam

Carrizo family soils

Taxonomic classification: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 1 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 70 percent

 cobble: 10 percent

Drainage class: excessively drained

Ksat solum: 19.98 to 39.69 inches per hour (141.00 to 280.00 micrometers per second)

Available water capacity total inches: 1.5 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: occasional

Runoff class: negligible

Hydrologic group: A

Ecological site name: Sandy Wash 7–10" p.z.

Ecological site number: R040XB216AZ

Present vegetation: burrobush, paloverde, catclaw acacia, ironwood, mesquite, ragweed

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence NE; about 1,000 feet north and 1,500 feet east of the southwest corner of Section 23, Township 3 S, Range 10 E

Geographic Coordinate System:

33° 9' 10.00" north, 111° 17' 45.00" west

C1—0 to 4 inches (0 to 10 cm); pale brown (10YR 6/3) very gravelly coarse sand, brown (10YR 5/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; few fine interstitial pores; 50 percent gravel; noneffervescent; slightly alkaline, pH 7.6; clear smooth boundary.

C2—4 to 32 inches (10 to 81 cm); pale brown (10YR 6/3) very gravelly coarse sand, brown (10YR 5/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and medium roots; few fine interstitial pores; 40 percent gravel and 10 percent cobble; slightly effervescent; slightly alkaline, pH 7.6; clear smooth boundary.

C3—32 to 60 inches (81 to 152 cm); pale brown (10YR 6/3) extremely cobbly coarse sand, brown (10YR 5/3), moist; 3 percent clay; single grain; loose, nonsticky and

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nonplastic; few very fine roots; few fine interstitial pores; 40 percent gravel and 30 percent cobble; slightly effervescent; slightly alkaline, pH 7.6.

Range in Characteristics

Rock fragments: 35 to 75 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 10 percent

Calcium carbonate equivalent: 0 to 5 percent

C horizons

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 2 to 6 moist

Chroma: 2 to 6 dry, 2 to 4 moist

Texture: coarse sand, sand, thin strata of finer textures

69—Nahda-Delnorte complex, 1 to 10 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,500 to 3,400 feet (762 to 1,036 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Nahda and similar soils: 60 percent

Delnorte and similar soils: 30 percent

Minor components: Topawa, Whitecliff, Queencreek, Riverwash, Stagecoach, Nahda soils that have less than 35 percent rock fragments, Nahda soils that have pans above 20 inches

Soil Properties and Qualities

Nahda soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic Argic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

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woody debris: 5 percent
bare soil: 10 percent
rock fragments
 gravel: 70 percent
 cobble: 20 percent
Depth to restrictive feature(s): 20 to 40 inches to petrocalcic
Drainage class: well drained
Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 2.6 (low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: low
Hydrologic group: C
Ecological site name: Clay Loam Upland 10–13" p.z.
Ecological site number: R040XA120AZ
Present vegetation: creosotebush, whitethorn, false mesquite, pricklypear and cholla, paloverde, annual grasses, ratany, Rothrock's grama, mesa threeawn, saguaro
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Peppersauce Wash; about 1,900 feet north and 500 feet west of the southeast corner of Section 26, Township 10 S, Range 17 E

Geographic Coordinate System:

32° 32' 13.00" north, 110° 34' 9.00" west

A—0 to 2 inches (0 to 5 cm); strong brown (7.5YR 5/6) very gravelly clay loam, brown (7.5YR 4/4), moist; 29 percent clay; weak thin platy parting to moderate fine granular structure; soft, very friable, moderately sticky and moderately plastic; common very fine and few medium roots; common fine irregular pores; 40 percent gravel and 2 percent cobble; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bt1—2 to 16 inches (5 to 41 cm); dark red (2.5YR 3/6) extremely gravelly clay, yellowish red (5YR 4/6), moist; 50 percent clay; moderate very fine and fine and medium subangular blocky structure; slightly hard, friable, very sticky and very plastic; many very fine and few medium roots; few very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 40 percent gravel and 20 percent cobble; noneffervescent; slightly alkaline, pH 7.6; clear wavy boundary.

Bt2—16 to 27 inches (41 to 69 cm); dark red (2.5YR 3/6) clay, yellowish red (5YR 4/6), moist; 52 percent clay; strong medium prismatic parting to strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; many very fine roots; few very fine tubular pores; many continuous distinct clay films on faces of peds, rock fragments and lining pores; many distinct pressure faces; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

Bkm—27 to 60 inches (69 to 152 cm); extremely hard; violently effervescent; cemented material, thin laminar; indurated; petrocalcic.

Range in Characteristics

Rock fragments: 5 to 60 percent, averages more than 35 percent

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Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 40 to 65 percent

A horizon

Hue: 7.5YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 3 to 6 dry, 3 or 4 moist
Texture: sandy loam, clay loam, loam

Bt horizons

Hue: 5YR, 2.5YR
Value: 3 to 5 dry, 3 or 4 moist
Chroma: 4 to 6 dry, 3 to 6 moist
Texture: clay, sandy clay, clay loam, sandy clay loam
Calcium carbonate equivalent: 0 to 10 percent

Bkm horizon

Cemented: calcium carbonate
Hardness: indurated
Thickness: 1 foot to 6 feet; continuous

Some pedons are underlain by consolidated (diatomite and calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials above 60 inches.

Delnorte soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 30 percent

woody debris: 5 percent

bare soil: 10 percent

rock fragments

gravel: 70 percent

cobble: 20 percent

Depth to restrictive feature(s): 7 to 20 inches to petrocalcic

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.6 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

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Ecological site name: Limy Upland 10–13" p.z.

Ecological site number: R040XA111AZ

Present vegetation: creosotebush, pricklypear and cholla, paloverde, annual grasses, ratany, hedgehog cactus, barrel cactus, ocotillo, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Peppersauce Wash; about 1,900 feet north and 1,300 feet west of the southeast corner of Section 26, Township 10 S, Range 17 E

Geographic Coordinate System:

32° 32' 11.00" north, 110° 34' 14.00" west

A—0 to 1 inch (0 to 3 cm); pale brown (10YR 6/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4), moist; 10 percent clay; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 40 percent gravel; violently effervescent, 15 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk—1 inch to 9 inches (3 to 23 cm); pale brown (10YR 6/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4), moist; 12 percent clay; moderate fine and medium subangular blocky structure; soft, friable, nonsticky and nonplastic; common very fine and few medium roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate masses; 40 percent gravel and 10 percent cobble; violently effervescent, 13 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bkm—9 to 60 inches (23 to 152 cm); extremely hard; violently effervescent; cemented material, thin laminar cap; indurated; petrocalcic; abrupt wavy boundary.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, fine sandy loam

Bk horizon

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

Calcium carbonate equivalent: 5 to 30 percent

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 6 feet; continuous

Some pedons are underlain by consolidated (diatomite and calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials above 60 inches.

70—Ohaco-Cave complex, 1 to 15 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,790 to 3,090 feet (547 to 942 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Ohaco and similar soils: 50 percent

Cave and similar soils: 30 percent

Minor components: Agustin, Riverwash, Rillino, Bucklebar, Tubac, Hayhook

Soil Properties and Qualities

Ohaco soils

Taxonomic classification: Clayey, mixed, superactive, thermic, shallow Typic Argidurids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 15 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 10 percent

 bare soil: 30 percent

rock fragments

 gravel: 65 percent

 cobble: 5 percent

Depth to restrictive feature(s): 10 to 20 inches to duripan

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.4 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: high

Hydrologic group: D

Ecological site name: Loamy Upland 10-13" p.z.

Ecological site number: R040XA114AZ

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Present vegetation: creosotebush, paloverde, saguaro, ocotillo, triangle bursage, ratany, white bursage, jumping cholla

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle North Butte; about 429 feet north and 495 feet east of the southwest corner of Section 6, Township 5 S, Range 11 E

Geographic Coordinate System:

33° 1' 3.30" north, 111° 16' 5.50" west

A—0 to 2 inches (0 to 5 cm); strong brown (7.5YR 5/6) sandy loam, brown (7.5YR 4/3), moist; 12 percent clay; weak thin platy parting to weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular and irregular pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bt1—2 to 9 inches (5 to 23 cm); strong brown (7.5YR 4/6) sandy clay loam, brown (7.5YR 4/4), moist; 34 percent clay; moderate fine and medium subangular blocky structure; moderately hard, friable, moderately sticky and moderately plastic; many very fine and common medium roots; many very fine tubular and interstitial pores; many continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; slightly alkaline, pH 7.6; clear wavy boundary.

Bt2—9 to 18 inches (23 to 46 cm); reddish brown (5YR 4/4) gravelly clay, yellowish red (5YR 4/6), moist; 46 percent clay; moderate very fine and fine subangular blocky structure; hard, very firm, very sticky and very plastic; many very fine and few fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 25 percent gravel and 3 percent cobble; noneffervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

Bkqm—18 to 60 inches (46 to 152 cm); cemented material, indurated duripan.

Range in Characteristics

Rock fragments: 0 to 30 percent

Reaction: 7.4 to 7.8 (slightly alkaline)

Average percent clay in the control section: 35 to 50 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy loam, sandy clay loam

Bt horizons

Hue: 7.5YR, 5YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 4 to 6 dry or moist

Texture: clay, sandy clay, sandy clay loam

Bkqm horizon

Cemented: calcium carbonate and silica

Hardness: indurated

Thickness: 1 foot to 6 feet; continuous

Ohaco as used in this mapping unit is a taxadjunct to the series because this soil is clayey and shallow to the duripan. Ohaco series is a Fine, mixed, superactive, thermic Typic Argidurids.

Cave soils

Taxonomic classification: Loamy, mixed, superactive, thermic, shallow Typic Haplodurids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 15 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 10 percent

 bare soil: 30 percent

rock fragments

 gravel: 25 percent

 cobble: 15 percent

Depth to restrictive feature(s): 7 to 20 inches to duripan

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.3 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: high

Hydrologic group: D

Ecological site name: Limy Upland 10–13" p.z.

Ecological site number: R040XA111AZ

Present vegetation: saguaro, triangle bursage, paloverde, ocotillo, annual forbs, creosotebush, white bursage, ratany, brittlebush, jumping cholla, buckhorn cholla, mormon tea

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle North Butte; about 2,375 feet north and 825 feet east of the southwest corner of Section 6, Township 5 S, Range 11 E

Geographic Coordinate System:

33° 1' 26.30" north, 111° 16' 4.90" west

A—0 to 1 inch (0 to 3 cm); light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4), moist; 10 percent clay; weak thin platy parting to weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine vesicular and tubular pores; 5 percent gravel; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk1—1 inch to 6 inches (3 to 15 cm); light yellowish brown (10YR 6/4) fine sandy loam, brown (10YR 5/3), moist; 12 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots;

many very fine tubular and irregular pores; many continuous distinct carbonate coats on faces of peds and rock fragments; 5 percent gravel; violently effervescent, 28 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk2—6 to 11 inches (15 to 28 cm); very pale brown (10YR 7/3) sandy loam, light yellowish brown (10YR 6/4), moist; 10 percent clay; moderate fine and medium subangular blocky structure; very hard, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; many continuous distinct carbonate coats on rock fragments; common fine and medium carbonate nodules; 10 percent gravel; violently effervescent, 24 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkqm—11 to 60 inches (28 to 152 cm); cemented material, indurated; 1/8-inch to ¼-inch laminar cap; duripan.

Range in Characteristics

Rock fragments: 0 to 30 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 10 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 to 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, fine sandy loam

Bk horizons

Hue: 10YR, 7.5YR

Value: 5 to 7 dry or moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, fine sandy loam

Calcium carbonate equivalent: 5 to 30 percent

Bkqm horizons

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 6 feet; continuous

71—Oracle-Romero-Combate complex, 1 to 20 percent slopes

Map Unit Setting

Landform(s): Oracle and Romero – pediments, Combate – alluvial fans

Elevation: 3,600 to 4,330 feet (1,097 to 1,320 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Oracle and similar soils: 45 percent

Romero and similar soils: 35 percent

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Combated and similar soils: 10 percent

Minor components: Riverwash, soils that have lithic contacts, Romero soils that have less than 35 percent rock fragments, Chiricahua, Deloro, Surge

Soil Properties and Qualities

Oracle soils

Taxonomic classification: Loamy, mixed, superactive, thermic, shallow Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 1 to 20 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 80 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 20 percent

 cobble: 10 percent

 stone: 5 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.9 (low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: high

Hydrologic group: C

Ecological site name: Granitic Upland 12–16" p.z.

Ecological site number: R041XC322AZ

Present vegetation: black grama, false mesquite, hairy grama, shrubby buckwheat, sideoats grama, slender grama, threeawn, cane beardgrass, catclaw acacia, ratany, tanglehead, pricklypear and cholla, yucca, bush muhly, mesquite, oak, sacahuista

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oracle; about 2,000 feet north and 1,600 feet west of the southwest corner of Section 34, Township 9 S, Range 15 E

Geographic Coordinate System:

32° 36' 24.00" north, 110° 48' 10.00" west

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A—0 to 4 inches (0 to 10 cm); brown (7.5YR 4/4) gravelly coarse sandy loam, dark brown (7.5YR 3/4), moist; 14 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine interstitial pores; 24 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt1—4 to 11 inches (10 to 28 cm); reddish brown (5YR 4/4) sandy clay loam, reddish brown (5YR 4/4), moist; 23 percent clay; strong medium and coarse subangular blocky structure; hard, firm, very sticky and very plastic; common very fine and few coarse roots; common very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

Bt2—11 to 19 inches (28 to 48 cm); reddish brown (5YR 4/3) sandy clay loam, yellowish red (5YR 4/6), moist; 23 percent clay; moderate fine and medium prismatic parting to strong fine and medium angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine roots between peds; common very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Crt—19 to 60 inches (48 to 152 cm); common continuous distinct clay films on bedrock; weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 0 to 25 percent

Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 2.5 to 4 moist

Chroma: 2 to 4 dry, 1 to 4 moist

Texture: sandy loam, coarse sandy loam

Bt horizons

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 to 4 dry, 4 to 6 moist

Texture: sandy clay loam, clay loam

Crt horizon

Granite and granodiorite bedrocks

Romero soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic, shallow Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 1 to 20 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

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Physical cover
 canopy plant cover: 80 percent
 woody debris: 5 percent
 bare soil: 5 percent
rock fragments
 gravel: 60 percent
 cobble: 5 percent
Depth to restrictive feature(s): 7 to 20 inches to bedrock, paralithic
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 1.0 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: high
Hydrologic group: C
Ecological site name: Granitic Upland 12–16" p.z.
Ecological site number: R041XC322AZ
Present vegetation: black grama, false mesquite, hairy grama, shrubby buckwheat, sideoats grama, slender grama, threeawn, cane beardgrass, catclaw acacia, ratany, tanglehead, pricklypear and cholla, bush muhly
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oracle; about 1,900 feet east and 2,400 feet north of the southwest corner of Section 34, Township 9 S, Range 15 E
Geographic Coordinate System:
32° 36' 25.00" north, 110° 48' 7.00" west

A1—0 to 3 inches (0 to 8 cm); brown (10YR 4/3) very gravelly sandy loam, dark brown (10YR 3/3), moist; 12 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine interstitial pores; 40 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt smooth boundary.

A2—3 to 15 inches (8 to 38 cm); dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2), moist; 15 percent clay; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few coarse roots; common very fine vesicular and tubular pores; 40 percent gravel and 5 percent cobble; noneffervescent; slightly acid, pH 6.2; abrupt wavy boundary.

Cr—15 to 60 inches (38 to 152 cm); weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 35 to 65 percent
Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)
Average percent clay in the control section: 5 to 18 percent

A horizons

Hue: 10YR, 7.5YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 2 or 3, dry or moist
Texture: sandy loam, loamy sand

Cr horizon

Granite and granodiorite bedrocks

Combate soils

Taxonomic classification: Coarse-loamy, mixed, superactive, nonacid, thermic Ustic Torrfluvents

Geomorphic position: proximal and distal

Parent material: mixed fan alluvium

Slope: 1 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 85 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 50 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 4.8 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: rare

Runoff class: very low

Hydrologic group: A

Ecological site name: Sandy Loam 12–16" p.z. Deep

Ecological site number: R041XC318AZ

Present vegetation: Arizona cottontop, cane beardgrass, dropseed, sideoats grama, threeawn, catclaw acacia, green sprangletop, plains bristlegrass, pricklypear and cholla, mesquite

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oracle; about 2,300 feet north and 1,600 feet west of the southeast corner of Section 34, Township 9 S, Range 15 E

Geographic Coordinate System:

32° 36' 25.00" north, 110° 48' 8.00" west

A—0 to 4 inches (0 to 10 cm); dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2), moist; 17 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine vesicular pores; 5 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

C1—4 to 24 inches (10 to 61 cm); very dark grayish brown (10YR 3/2) gravelly sandy loam, very dark brown (10YR 2/2), moist; 18 percent clay; massive; soft, very friable, slightly sticky and slightly plastic; common very fine, medium and few coarse roots; common very fine interstitial pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.4; clear smooth boundary.

C2—24 to 45 inches (61 to 114 cm); very dark grayish brown (10YR 3/2) gravelly sandy loam, very dark brown (10YR 2/2), moist; 18 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; common medium roots; common very fine vesicular pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt wavy boundary.

C3—45 to 60 inches (114 to 152 cm); brown (10YR 5/3) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2), moist; 5 percent clay; single grain; loose, nonsticky and nonplastic; 20 percent gravel; noneffervescent; neutral, pH 6.6.

Range in Characteristics

Rock fragments: 5 to 30 percent

Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)

Average percent clay in the control section: 5 to 18 percent

A and C horizons

Hue: 7.5YR, 10YR

Value: 3 to 5 dry, 2 or 3 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam, coarse sandy loam, loamy sand

72—Oxyaquic Torrifluents-Riverwash complex, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 3,500 to 4,300 feet (1,067 to 1,311 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41—3 Southern Arizona Semidesert Grassland

Stream Segment Properties and Qualities

Segment length: about 5 miles of Copper Creek starting at the Pinal-Graham county line and running west to the mouth of the canyon

Average active channel width: 30 to 200 feet

Stream flow: perennial in places, but intermittent in drought years

Flooding hazard: frequent; brief; 2 to 7 days

Flooding month: July-September and January-March

Water table depth: 0 to 25 inches

Water table kind: apparent

Water table present: year round

Bank entrenchment –

percent cut: 90

percent uncut: 10

vertical cut: 0.5 foot to 40 feet; averages about 24 inches

Depositional bar features: dynamic system of interbraided bars and channels that relocate with each major flood event

Meander pattern: irregular meander, within rock canyon walls

Bank channel composition:

percent bedrock: 45

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

percent cobbles: 20
percent gravel: 20
percent sand: 10
percent silt and clay: 5
Stability: a dynamic system of interbraided components that aggrades and degrades seasonally

Map Unit Composition

Oxyaquic Torrfluvents and similar soils: 60 percent
Riverwash: 30 percent

Minor components: Water, Combate, soils shallow to moderately deep to bedrock, soils that have high water tables

Soil Properties and Qualities

Oxyaquic Torrfluvents soils

Taxonomic classification: Oxyaquic Torrfluvents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 10 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 80 percent

 woody debris: 10 percent

 bare soil: 10 percent

rock fragments

 gravel: 55 percent

 cobble: 35 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)

Available water capacity total inches: 1.4 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: frequent

Seasonal water table minimum depth: about 20 to 60 inches

Runoff class: very low

Hydrologic group: A

Ecological site name: Populus fremontii-Salix gooddingii/Muhlenbergia rigens-Anemopsis californica

Ecological site number: F041XC317AZ

Present vegetation: Bermuda grass, seepwillow baccharis, cottonwood, mesquite, willow

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oak Grove Canyon; about 2,900 feet

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

south and 1,900 feet east of the northwest corner of Section 10, Township 8 S,
Range 18 E

Geographic Coordinate System:

32° 44' 54.00" north, 110° 30' 0.00" west

A—0 to 2 inches (0 to 5 cm); brown (10YR 5/3) very cobbly sandy loam, very dark grayish brown (10YR 3/2), moist; 8 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 50 percent cobble; noneffervescent; neutral, pH 7.2; abrupt smooth boundary.

C1—2 to 17 inches (5 to 43 cm); yellowish brown (10YR 5/4) extremely cobbly loamy fine sand, dark brown (10YR 3/3), moist; 7 percent clay; massive; loose, very friable, nonsticky and nonplastic; many very fine and common medium roots; many very fine interstitial pores; 25 percent gravel and 45 percent cobble; noneffervescent; neutral, pH 7.2; abrupt smooth boundary.

C2—17 to 60 inches (43 to 152 cm); yellowish brown (10YR 5/4) extremely gravelly coarse sand, dark brown (10YR 3/3), moist; 4 percent clay; single grain; loose, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 55 percent gravel and 15 percent cobble; noneffervescent; neutral, pH 7.2.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 2 to 10 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 3 to 5 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam, coarse sand, fine sand, silt loam, fine sandy loam

C horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4, dry or moist

Texture: coarse sand, loamy fine sand, sand with thin strata of sandy loam, silt loam, clay

Redoximorphic features: few to common redoximorphic concentrations occurring as masses and linings along root channels (7.5YR 8/8, 7.5YR 6/6); few to common redoximorphic depletions (5BG 3/1, 10BG 3/1, 5B 3/1 10B 3/1); usually occur in strata finer than loamy fine sand

Riverwash

Width: 2 to 25 feet

Depth of water when present: 3 to 36 inches

Riverwash consists of shallow to very deep, excessively drained, stratified sands, gravels, and cobbles from numerous sources. This material is part of a dynamic interbraided system of bars and channels, commonly bordered by shallow to steep vertical banks cut into the alluvium. This material is not stable and is subject to shifting and sorting. It is usually dry but can be transformed into a temporary watercourse or a short-lived torrent after a heavy rain within the watershed. In very wet years surface water is present for part of the year, replacing Riverwash with water. This material does not support vegetation because of the constant scouring and shifting it undergoes.

73—Pantak-Rock outcrop-Lampshire complex, 5 to 60 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 3,400 to 4,400 feet (1,036 to 1,341 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Pantak and similar soils: 45 percent

Rock outcrop: 35 percent

Lampshire and similar soils: 15 percent

Minor components: Eskiminzin, Lampshire soils that have less than 35 percent rock fragments

Soil Properties and Qualities

Pantak soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Lithic Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from andesite

Slope: 5 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 30 percent

 cobble: 30 percent

 stone: 10 percent

Depth to restrictive feature(s): 7 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.0 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 12–16" p.z. Loamy

Ecological site number: R041XC323AZ

Present vegetation: sideoats grama, Emory oak, sacahuista, oneseed juniper, hairy grama, shrubby buckwheat, mesquite, purple grama, plains lovegrass, bullgrass, pricklypear and cholla

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Booger Canyon; about 2,000 feet west and 800 feet north of the southeast corner of Section 23, Township 5 S, Range 18 E

Geographic Coordinate System:

32° 58' 44.00" north, 110° 28' 29.00" west

A—0 to 2 inches (0 to 5 cm); brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3), moist; 14 percent clay; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine irregular pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.2; clear smooth boundary.

Bt—2 to 11 inches (5 to 28 cm); brown (10YR 4/3) very cobbly loam, very dark brown (10YR 2/2), moist; 23 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; common fine and few medium roots; few fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 20 percent gravel and 30 percent cobble; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

R—11 to 60 inches (28 to 152 cm); unweathered andesite bedrock.

Range in Characteristics

Rock fragments: 20 to 65 percent, averages more than 35 percent

Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 2 to 4 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam, loam

Bt horizons

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3, dry or moist

Texture: loam, sandy clay loam, clay loam

R horizon

Andesite and volcanic bedrocks

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of andesite and other volcanic bedrocks. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Lampshire soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from andesite

Slope: 5 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 30 percent

 cobble: 20 percent

 stone: 10 percent

Depth to restrictive feature(s): 5 to 15 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 0.8 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic Hills 12–16" p.z. Loamy

Ecological site number: R041XC323AZ

Present vegetation: shrubby buckwheat, mesquite, beggartick threeawn, Emory oak, hairy grama, sideoats grama, sotol, oneseed juniper, pricklypear and cholla, mimosa

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Booger Canyon; about 2,350 feet west and 1,000 feet north of the southeast corner of Section 23, Township 5 S, Range 18 E

Geographic Coordinate System:

32° 58' 45.00" north, 110° 28' 30.00" west

A—0 to 1 inch (0 to 3 cm); brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3), moist; 14 percent clay; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 30 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

C—1 inch to 9 inches (3 to 23 cm); brown (10YR 4/3) very cobbly loam, very dark grayish brown (10YR 3/2), moist; 19 percent clay; weak fine subangular blocky

structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; few fine tubular pores; 30 percent gravel and 25 percent cobble; noneffervescent; slightly acid, pH 6.2; abrupt wavy boundary.

R—9 to 60 inches (23 to 152 cm); unweathered andesite bedrock.

Range in Characteristics

Rock fragments: 30 to 65 percent, averages more than 35 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 10 to 20 percent

A and C horizons

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam, loam

R horizon

Andesite and volcanic bedrocks

74—Pantano-Anklam-Rock outcrop complex, 3 to 20 percent slopes

Map Unit Setting

Landform(s): hills, pediments

Elevation: 1,640 to 4,000 feet (501 to 1,220 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Pantano and similar soils: 40 percent

Anklam and similar soils: 25 percent

Rock outcrop: 20 percent

Minor components: Stagecoach, Queencreek, Riverwash, Gran, Delnorte, Agustin, Carcara, soils that are shallow to bedrock

Soil Properties and Qualities

Pantano soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Typic Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 3 to 20 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 40 percent
woody debris: 10 percent
bare soil: 20 percent
rock fragments
gravel: 35 percent
cobble: 15 percent
Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic; 20 to 45 inches to bedrock, paralithic
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 0.7 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: high
Hydrologic group: C
Ecological site name: Limy Hills 10–13" p.z.
Ecological site number: R040XA129AZ
Present vegetation: paloverde, brittlebush, creosotebush, pricklypear and cholla, triangle bursage, whitethorn acacia, wolfberry, ironwood, ocotillo, saguaro
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle North Butte; about 3,261 feet north and 2,155 feet east of the southwest corner of Section 17, Township 4 S, Range 11 E

Geographic Coordinate System:

33° 5' 1.20" north, 111° 14' 34.30" west

A—0 to 1 inch (0 to 3 cm); yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3), moist; 10 percent clay; moderate thick and very thick platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; 55 percent gravel; violently effervescent, 3 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk—1 inch to 17 inches (3 to 43 cm); pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3), moist; 10 percent clay; weak fine granular structure; loose, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; common continuous distinct carbonate coats on rock fragments; 70 percent gravel; violently effervescent, 17 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Crk—17 to 37 inches (43 to 94 cm); common continuous distinct carbonate coats along fractures; weathered granite bedrock; abrupt wavy boundary.

Cr—37 to 60 inches (94 to 152 cm); weathered granite bedrock.

Range in Characteristics

Rock fragments: 35 to 75 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, coarse sandy loam

Calcium carbonate equivalent: 0 to 5 percent

Bk horizon

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4 dry, 3 or 4 moist

Texture: loamy sand, sandy loam

Calcium carbonate equivalent: 5 to 20 percent

Cr horizons

Granite bedrock

Some pedons have a lithic contact below the paralithic within depths of 35 to 60 inches.

Anklam soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 3 to 20 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 10 percent

bare soil: 20 percent

rock fragments

gravel: 25 percent

cobble: 5 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic; 20 to 60 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.0 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: high

Hydrologic group: C

Ecological site name: Granitic Upland 10–13" p.z.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site number: R040XA121AZ

Present vegetation: triangle bursage, paloverde, brittlebush, ironwood, pricklypear and cholla, wolfberry, creosotebush, jojoba

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle North Butte; about 2,670 feet north and 2,204 feet east of the southwest corner of Section 17, Township 4 south, Range 11 east

Geographic Coordinate System:

33° 4' 55.50" north, 111° 14' 33.70" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 4/4) very gravelly sandy loam, dark brown (7.5YR 3/3), moist; 10 percent clay; moderate thick and very thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and tubular pores; 40 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt1—1 inch to 7 inches (3 to 18 cm); reddish brown (5YR 4/4) very gravelly sandy clay loam, reddish brown (5YR 4/3), moist; 30 percent clay; moderate very fine and fine subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; many very fine and common medium roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 55 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt wavy boundary.

Bt2—7 to 16 inches (18 to 41 cm); reddish brown (5YR 4/4) extremely gravelly sandy clay loam, reddish brown (5YR 4/3), moist; 32 percent clay; strong very fine and fine subangular blocky structure; hard, friable, very sticky and very plastic; common very fine roots; many very fine interstitial and few fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments and; 70 percent gravel; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Crt—16 to 27 inches (41 to 69 cm); many continuous distinct clay films along fractures; weathered granite bedrock.

Cr—27 to 60 inches (69 to 152 cm); weathered granite bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 5YR, 7.5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 2 to 4 dry or moist

Texture: sandy loam, coarse sandy loam

Bt horizons

Hue: 2.5 YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 4 or 6 dry, 3 to 6 moist

Texture: clay loam, sandy clay loam

Cr horizons

Granite bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of granite bedrock. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the summits of the hills.

75—Pinamt-Gunsight complex, 1 to 8 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,310 to 2,000 feet (400 to 610 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-2 Middle Sonoran Desert Shrub

Map Unit Composition

Pinamt and similar soils: 65 percent

Gunsight and similar soils: 25 percent

Minor components: Beardsley, Hickiwan, Ebon

Soil Properties and Qualities

Pinamt soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Calciargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 25 percent

rock fragments

 gravel: 45 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 3.9 (low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: medium

Hydrologic group: C

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site name: Loamy Upland 7–10" p.z.

Ecological site number: R040XB213AZ

Present vegetation: creosotebush, pricklypear and cholla, triangle bursage, bush
muhly, white ratany

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of Pinal County, Arizona, Western Part; USGS Quadrangle Indian Butte; about 1,380 feet north and 125 feet east of the southwest corner of Section 11, Township 7 S, Range 3 E

Geographic Coordinate System:

32° 50' 10.00" north, 112° 1' 20.00" west

A—0 to 2 inches (0 to 5 cm); light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4), moist; 15 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many fine tubular pores; 40 percent gravel; slightly effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—2 to 7 inches (5 to 18 cm); yellowish red (5YR 5/6) very gravelly clay loam, yellowish red (5YR 4/6), moist; 31 percent clay; weak fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine roots; few very fine tubular pores; very few continuous faint clay films on faces of peds; 55 percent gravel; strongly effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Btk1—7 to 20 inches (18 to 51 cm); yellowish red (5YR 5/6) very gravelly clay loam, yellowish red (5YR 4/6), moist; 31 percent clay; weak fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; few very fine roots; common very fine tubular pores; very few continuous faint clay films on faces of peds; common medium carbonate masses; 59 percent gravel; strongly effervescent; moderately alkaline, pH 8.2; clear wavy boundary.

Btk2—20 to 23 inches (51 to 58 cm); light reddish brown (5YR 6/4) very gravelly sandy clay loam, reddish brown (5YR 4/4), moist; 28 percent clay; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; very few continuous faint clay films on faces of peds; common medium carbonate masses; 59 percent gravel; violently effervescent; moderately alkaline, pH 8.2; clear wavy boundary.

Bk1—23 to 54 inches (58 to 137 cm); light brown (7.5YR 6/4) extremely gravelly sandy loam, brown (7.5YR 5/4), moist; 12 percent clay; massive; slightly hard, friable, nonsticky and nonplastic; few fine interstitial pores; common medium carbonate masses; 75 percent gravel; violently effervescent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bk2—54 to 60 inches (137 to 152 cm); pinkish gray (7.5YR 6/2) very gravelly sandy loam, pinkish gray (7.5YR 7/2), moist; 12 percent clay; massive; hard, friable, nonsticky and nonplastic; common fine interstitial pores; many coarse carbonate masses; 59 percent gravel; violently effervescent; moderately alkaline, pH 8.2.

Range in Characteristics

Rock fragments: 35 to 75 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 25 to 35 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

A horizon

Hue: 10YR, 7.5YR
Value: 4 to 6 dry, 3 to 5 moist
Chroma: 3 or 4, dry or moist
Texture: fine sandy loam, loam

Bt and Btk horizons

Hue: 7.5YR, 5YR
Value: 4 to 6 dry, 3 to 5 moist
Chroma: 4 to 6, dry or moist
Texture: loam, clay loam, sandy clay loam
Calcium carbonate equivalent: 1 to 20 percent

Bk horizons

Hue: 10YR, 7.5YR
Value: 6 to 8 dry, 4 to 7 moist
Chroma: 2 to 6, dry or moist
Texture: sandy loam, loam, sandy clay loam
Calcium carbonate equivalent: 5 to 30 percent

Gunsight soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 25 percent

woody debris: 10 percent

bare soil: 40 percent

rock fragments

gravel: 45 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 5.6 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: A

Ecological site name: Limy Upland 7–10" p.z.

Ecological site number: R040XB210AZ

Present vegetation: creosotebush, buckhorn cholla, jumping cholla, triangle bursage

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil survey of Pinal County,

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Arizona, Western Part; USGS Quadrangle Silver Reef Mountain; about 200 feet north and 1,800 feet east of the southwest corner of Section 7, Township 9 S, Range 6 E

Geographic Coordinate System:

32° 38' 15.00" north, 111° 46' 25.00" west

A—0 to 3 inches (0 to 8 cm); light brown (7.5YR 6/4) very gravelly fine sandy loam, brown (7.5YR 5/4), moist; 10 percent clay; weak very thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; few very fine tubular pores; 40 percent gravel; strongly effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Bw—3 to 12 inches (8 to 30 cm); pink (7.5YR 7/4) gravelly loam, brown (7.5YR 5/4), moist; 12 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; few very fine tubular pores; very few patchy distinct carbonate coats on bottom surfaces of rock fragments; 20 percent gravel; strongly effervescent; moderately alkaline, pH 8.2; clear wavy boundary.

Bk1—12 to 34 inches (30 to 86 cm); light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4), moist; 12 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine interstitial pores; common patchy distinct carbonate coats on bottom surfaces of rock fragments; many medium carbonate masses; 40 percent gravel; violently effervescent; strongly alkaline, pH 8.6; gradual wavy boundary.

Bk2—34 to 60 inches (86 to 152 cm); light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4), moist; 12 percent clay; massive; slightly hard, very friable, moderately sticky and slightly plastic; few very fine roots; common very fine interstitial pores; common patchy distinct carbonate coats on rock fragments; common medium carbonate masses; 50 percent gravel; violently effervescent; strongly alkaline, pH 8.6.

Range in Characteristics

Rock fragments: 40 to 70 percent

Average percent clay in the control section: 5 to 20 percent

Calcium carbonate equivalent: 5 to 25 percent

A horizon

Hue: 10YR, 7.5YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, fine sandy loam

Reaction: 7.9 to 8.4 (moderately alkaline)

B horizons

Hue: 10YR, 7.5YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam, loamy sand

Reaction: 7.9 to 9.0 (moderately to strongly alkaline)

76—Pinamt-Momoli complex, 1 to 8 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,190 to 1,990 feet (363 to 608 meters)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40–Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Pinamt and similar soils: 50 percent

Momoli and similar soils: 30 percent

Minor components: Carrizo, Riverwash

Soil Properties and Qualities

Pinamt soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Calciargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 25 percent

 woody debris: 10 percent

 bare soil: 20 percent

rock fragments

 gravel: 45 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 3.3 (low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: medium

Hydrologic group: B

Ecological site name: Limy Upland 7–10" p.z. Deep

Ecological site number: R040XB208AZ

Present vegetation: creosotebush, pricklypear and cholla, saguaro, triangle bursage, paloverde, brittlebush, bush muhly, range ratany

Land capability (non irrigated): 7s

Typical Profile

Location

Public Land Survey: Typical pedon is from Soil Survey of Pinal County, Arizona, Western Part; about 1,380 feet north and 125 feet east of the southwest corner of Section 11, Township 7 S, Range 3 E

Geographic Coordinate System:

32° 49' 46.10" north, 112° 1' 44.11" west

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

A—0 to 2 inches (0 to 5 cm); light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4), moist; 18 percent clay; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many fine tubular pores; 30 percent gravel; slightly effervescent, 1 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bt—2 to 7 inches (5 to 18 cm); yellowish red (5YR 5/6) very gravelly clay loam, yellowish red (5YR 4/6), moist; 32 percent clay; weak fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine and fine roots; few very fine tubular pores; few continuous distinct clay films on faces of peds; 55 percent gravel; strongly effervescent, 5 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Btk1—7 to 20 inches (18 to 51 cm); yellowish red (5YR 5/6) extremely gravelly clay loam, yellowish red (5YR 4/6), moist; 32 percent clay; weak fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; few very fine roots; common very fine tubular pores; few continuous distinct clay films on faces of peds; common medium carbonate masses; 65 percent gravel; strongly effervescent, 15 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear wavy boundary.

Btk1—20 to 23 inches (51 to 58 cm); light reddish brown (5YR 6/4) extremely gravelly sandy clay loam, reddish brown (5YR 4/4), moist; 27 percent clay; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; few continuous distinct clay films on faces of peds; many medium carbonate masses; 60 percent gravel; violently effervescent, 15 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear wavy boundary.

Bk1—23 to 54 inches (58 to 137 cm); light brown (7.5YR 6/4) extremely gravelly sandy loam, brown (7.5YR 5/4), moist; 13 percent clay; massive; slightly hard, friable, nonsticky and nonplastic; few fine interstitial pores; many fine carbonate masses; 75 percent gravel; violently effervescent, 20 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk2—54 to 60 inches (137 to 152 cm); pinkish gray (7.5YR 6/2) extremely gravelly sandy loam, pinkish gray (7.5YR 7/2), moist; 13 percent clay; massive; hard, friable, nonsticky and nonplastic; common fine interstitial pores; many coarse carbonate masses; 60 percent gravel; violently effervescent, 20 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 30 to 75 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: fine sandy loam, loam

Bt and Btk horizons

Hue: 7.5YR, 5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 4 to 6, dry or moist

Texture: loam, clay loam, sandy clay loam

Calcium carbonate equivalent: 1 to 20 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Bk horizon

Hue: 10YR, 7.5YR
Value: 5 to 7 dry or moist
Chroma: 2 to 6, dry or moist
Texture: sandy loam, loam, sandy clay loam
Calcium carbonate equivalent: 5 to 30 percent

Momoli soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent
lichen: 0 percent
moss: 0 percent

Chemical crust

salt: 0 percent
gypsum: 0 percent

Physical cover

canopy plant cover: 25 percent
woody debris: 10 percent
bare soil: 20 percent

rock fragments

gravel: 50 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 3.2 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very low

Hydrologic group: A

Ecological site name: Limy Upland 7–10" p.z. Deep

Ecological site number: R040XB208AZ

Present vegetation: creosotebush, triangle bursage, bush muhly

Land capability (non irrigated): 7s

Typical Profile

Location

Public Land Survey: Typical pedon description is from Soil Survey of Pinal County, Arizona, Western Part; about 800 feet north and 600 feet west of the southeast corner of Section 33, Township 6 S, Range 3 E

Geographic Coordinate System:

32° 51' 9.40" north, 112° 2' 2.13" west

A—0 to 2 inches (0 to 5 cm); light brown (7.5YR 6/4) very gravelly fine sandy loam, brown (7.5YR 4/4), moist; 9 percent clay; weak medium platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine vesicular pores; 50 percent gravel; slightly effervescent, 1 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bw—2 to 26 inches (5 to 66 cm); light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 4/4), moist; 9 percent clay; massive; soft, very friable, nonsticky and

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

nonplastic; many very fine roots; many very fine interstitial pores; few discontinuous faint carbonate coats on bottom surfaces of rock fragments; common fine carbonate masses; 50 percent gravel; strongly effervescent, 1 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk1—26 to 34 inches (66 to 86 cm); brown (7.5YR 5/4) extremely gravelly sandy loam, brown (7.5YR 4/4), moist; 9 percent clay; single grain; loose, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; few discontinuous faint carbonate coats on rock fragments; common fine carbonate masses; 60 percent gravel; strongly effervescent, 3 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear wavy boundary.

Bk2—34 to 60 inches (86 to 152 cm); light brown (7.5YR 6/4) very gravelly loamy sand, brown (7.5YR 5/4), moist; 8 percent clay; single grain; loose, nonsticky and nonplastic; many fine interstitial pores; few patchy distinct carbonate coats on rock fragments; common fine carbonate masses; 45 percent gravel; slightly effervescent, 3 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 35 to 75 percent

Calcium carbonate equivalent: 0 to 5 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 4 to 6, dry or moist

Texture: fine sandy loam, sandy loam

B horizons

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 4 to 6 dry or moist

Texture: sandy loam, loamy sand

77—Powerline-Kimrose family complex, 10 to 35 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 3,400 to 3,800 feet (1,036 to 1,158 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Powerline and similar soils: 40 percent

Kimrose family and similar soils: 35 percent

Minor components: Tombstone, Bodecker

Soil Properties and Qualities

Powerline soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Ustic
Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 10 to 35 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 29 percent

 cobble: 29 percent

Depth to restrictive feature(s): 20 to 40 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

Available water capacity total inches: 2.7 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Limy Slopes 12–16" p.z.

Ecological site number: R041XC308AZ

Present vegetation: black grama, sideoats grama, bush muhly, whitethorn, banana yucca, blue threeawn, desert zinnia, false mesquite, range ratany, sand dropseed, slim tridens

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of Pima County, AZ, Eastern Part; about 300 feet east and 1,800 feet north of the southwest corner of Section 12, Township 17 S, Range 17 E

Geographic Coordinate System:

32° 58' 1.00" north, 110° 34' 9.0" west

A—0 to 3 inches (0 to 8 cm); pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3), moist; 12 percent clay; weak thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; common fine tubular pores; 40 percent gravel; strongly effervescent; moderately alkaline, pH 8.2; clear smooth boundary.

Bk1—3 to 17 inches (8 to 43 cm); very pale brown (10YR 7/3) gravelly loam, light

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yellowish brown (10YR 6/4), moist; 15 percent clay; weak medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine and fine roots; common very fine tubular pores; very few continuous distinct carbonate coats on rock fragments and lining pores; 25 percent gravel and 5 percent cobble; violently effervescent; moderately alkaline, pH 8.2; gradual wavy boundary.

Bk2—17 to 29 inches (43 to 74 cm); very pale brown (10YR 7/3) very gravelly sandy loam, light yellowish brown (10YR 6/4), moist; 15 percent clay; massive; hard, firm, slightly sticky and slightly plastic; few very fine and common fine and medium roots; common fine and medium tubular pores; few continuous distinct carbonate coats on rock fragments and lining pores; 50 percent gravel and 5 percent cobble; violently effervescent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Crk—29 to 60 inches (74 to 152 cm); strongly effervescent; thin continuous calcium carbonate cemented cap on weathered sandy fanglomerate bedrock.

Range in Characteristics

Rock fragments: 30 to 60 percent

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 10 to 20 percent

A and Bk horizon

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 4 to 6 moist

Chroma: 2 to 4 dry, 3 or 4 moist

Texture: loam, sandy loam, fine sandy loam

Calcium carbonate equivalent: 15 to 35 percent

Hard sandy fanglomerate bedrock

Kimrose family soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 10 to 15 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 29 percent

cobble: 29 percent

stone: 10 percent

Depth to restrictive feature(s): 7 to 20 inches to petrocalcic; 10 to 40 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

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Ksat restrictive layer: 0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

Available water capacity total inches: 0.4 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Upland 12–16" p.z.

Ecological site number: R041XC309AZ

Present vegetation: creosotebush, bush muhly, whitethorn, black grama, desert zinnia, paloverde, ocotillo, pricklypear and cholla, slender janusia

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: Typical pedon is from the Soil Survey of Pima County, AZ, Eastern Part; about 2,050 feet west and 625 feet north of the southeast corner of Section 9, Township 17 S, Range 18 E

Geographic Coordinate System:

31° 57' 51.0" north, 110° 30' 31.0" west

A—0 to 7 inches (0 to 18 cm); dark grayish brown (10YR 4/2) extremely gravelly loam, very dark brown (10YR 2/2), moist; 16 percent clay; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; common very fine roots; common fine tubular pores; 55 percent gravel and 10 percent cobble and 10 percent stone; strongly effervescent, 13 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bkm—7 to 12 inches (18 to 30 cm); cemented material, indurated; petrocalcic; abrupt wavy boundary.

Cr—12 to 60 inches (30 to 152 cm); weathered sandy fanglomerate bedrock.

Range in Characteristics

Rock fragments: 35 to 75 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 10 to 25 percent

Calcium carbonate equivalent: 5 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 2 to 4 moist

Chroma: 1 to 3, dry or moist

Texture: loam, sandy clay loam, sandy loam

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 4 to 17 inches; continuous

Cr horizon

Sandy fanglomerate bedrock

Kimrose as used in this mapping unit is at the family level. These soils are underlain by weathered hard sandy fanglomerate bedrock.

78—Queencreek soils and Riverwash, 0 to 5 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,800 to 3,800 feet (549 to 1,158 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Stream Segment Properties and Qualities

Active flood plain width: 5 to 500 feet

Stream flow: intermittent stream; usually dry but can flow seasonally with rainfall events

Flooding hazard: frequent, brief

Flooding month: July–September

Bank entrenchment –

percent cut: 80

percent uncut: 20

vertical cut: 1 foot to 30 feet; averages 3 to 10 feet

Depositional bar features: dynamic system of interbraided bars and channels that relocate with each major flood event

Channel composition:

percent bedrock: 0

percent cobbles: 20

percent gavel: 40

percent sand: 20

percent silt and clay: 20

Stability: a dynamic system of interbraided components that aggrade and degrade seasonally

Map Unit Composition

This is an undifferentiated map unit. These components are not consistently associated geographically. At least one component is present in every delineation, but each delineation can have any combination of the components. This map unit is not consistent over time. Its components consist of a dynamic interbraided system of bars and channels. The active stream dynamics cause these components to shift locations. During severe rainfall events, the channel will cut and fill throughout its length.

Minor components: soils that have less than 35 percent rock fragments, Kokan, Agustín, soils that have slopes greater than 5 percent

Soil Properties and Qualities

Queencreek soils

Taxonomic classification: Sandy-skeletal, mixed, thermic Typic Torrifuvents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Slope: 0 to 5 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 15 percent

rock fragments

 gravel: 80 percent

 cobble: 5 percent

Drainage class: excessively drained

Ksat solum: 1.98 to 39.69 inches per hour (14.00 to 280.00 micrometers per second)

Available water capacity total inches: 2.3 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: occasional

Runoff class: negligible

Hydrologic group: A

Ecological site name: Sandy Wash 10–13" p.z.

Ecological site number: R040XA115AZ

Present vegetation: burrobush, paloverde, whitethorn, catclaw acacia, mesquite, staghorn cholla

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; about 800 feet south and 2,500 feet west of the northeast corner of Section 33, Township 4 S, Range 14 E

Geographic Coordinate System:

33° 2' 43.00" north, 110° 55' 21.00" west

C1—0 to 7 inches (0 to 18 cm); brown (10YR 5/3) extremely gravelly sandy loam, brown (10YR 4/3), moist; 6 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many fine irregular pores; 60 percent gravel and 5 percent cobble; very slightly effervescent; slightly alkaline, pH 7.6; abrupt wavy boundary.

C2—7 to 17 inches (18 to 43 cm); brown (10YR 5/3) very gravelly sand, brown (10YR 4/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common fine, medium and coarse roots; many fine irregular pores; 37 percent gravel; slightly effervescent; slightly alkaline, pH 7.8; abrupt wavy boundary.

C3—17 to 60 inches (43 to 152 cm); brown (10YR 5/3) stratified very gravelly coarse sand to very gravelly fine sand, brown (10YR 4/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common fine and coarse roots; many fine irregular pores; 46 percent gravel; slightly effervescent; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 0 to 4 percent

Gypsum: 0 to 4 percent

C horizons

Hue: 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: coarse sand, sand, loamy sand, loamy coarse sand with thin stratifications of sandy loam, fine sandy loam, and silty clay loam

Riverwash

Width: 2 to 400 feet

Depth of water when present: 0 to 36 inches

Riverwash consists of very deep, excessively drained, stratified sands, gravels, and cobbles from numerous sources. This material is located in a dynamic interbraided system of bars and channels, commonly bordered by shallow to steep vertical banks cut into the alluvium. This material is not stable and is subject to shifting and sorting. It is usually dry but can be transformed into a temporary watercourse or a short-lived torrent after a heavy rain within the watershed. In very wet years surface water is present for part of the year, replacing Riverwash with water. This material does not support vegetation because of the constant scouring and shifting it undergoes.

79—Quiburi-Gila complex, 0 to 3 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,750 to 2,700 feet (532 to 822 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Quiburi and similar soils: 50 percent

Gila and similar soils: 35 percent

Minor components: Vinton, Queencreek, fine-silty Oxyaquic Torrifuents, Gila that have gravelly substratums

Soil Properties and Qualities

Quiburi soils

Taxonomic classification: Coarse-loamy, mixed, superactive, calcareous, thermic Oxyaquic Torrifuents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

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moss: 5 percent
Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 85 percent
slightly decomposed litter: 90 percent
woody debris: 10 percent
bare soil: 0 percent
rock fragments: 0 percent
Drainage class: moderately well drained
Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)
Available water capacity total inches: 10.4 (very high)
Shrink-swell potential: about 4.5 LEP (moderate)
Flooding hazard: occasional
Seasonal water table minimum depth: about 30 to 60 inches
Runoff class: very low
Hydrologic group: B
Ecological site name: Prosopis velutina/Sporobolus wrightii
Ecological site number: F040XA124AZ
Present vegetation: tamarisk, mesquite, Fremont cottonwood, Gooding willow, velvet ash
Land capability (irrigated): 3w
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Winkelman; about 400 feet south and 1,500 feet west of the northeast corner of Section 36, Township 5 S, Range 15 E

Geographic Coordinate System:
32° 57' 51.00" north, 110° 45' 42.00" west

C1—0 to 8 inches (0 to 20 cm); brown (10YR 5/3) very fine sandy loam, brown (10YR 4/3), moist; 7 percent clay; moderate thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine interstitial pores; violently effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C2—8 to 22 inches (20 to 56 cm); brown (10YR 5/3) silt loam, brown (10YR 4/3), moist; 8 percent clay; massive; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; common fine tubular pores; few distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine soft iron masses; violently effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

C3—22 to 37 inches (56 to 94 cm); brown (10YR 5/3) silt loam, brown (10YR 4/3), moist; 18 percent clay; massive; soft, very friable, slightly sticky and moderately plastic; many fine roots and common coarse roots; common fine tubular pores; many distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine soft iron masses; violently effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Cky1—37 to 42 inches (94 to 107 cm); brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3), moist; 34 percent clay; weak medium and coarse subangular blocky structure; slightly hard, friable, moderately sticky and very plastic; common fine roots and common coarse roots; common fine tubular pores; very few distinct organic stains; few distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine

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soft iron masses; many fine carbonate and gypsum masses; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Cky2—42 to 60 inches (107 to 152 cm); 50 percent brown (10YR 4/3) and 50 percent brown (10YR 5/3) stratified silt loam to silty clay loam, dark brown (10YR 3/3) and brown (10YR 4/3), moist; 24 percent clay; massive; soft, very friable, slightly sticky and moderately plastic; common coarse roots; common fine tubular pores; very few distinct organic stains; few distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine soft iron masses; few fine carbonate and gypsum masses; violently effervescent; strongly alkaline, pH 8.8.

Range in Characteristics

Average percent clay in the control section: 5 to 18 percent

Calcium carbonate equivalent: 0 to 4 percent

C horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 6 moist

Chroma: 3 to 6 dry, 2 to 4 moist

Texture: silt loam, very fine sandy loam, fine sandy loam

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Cky horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 6 moist

Chroma: 3 to 6 dry, 2 to 4 moist

Texture: silt loam, very fine sandy loam, fine sandy loam can have thin stratifications of silty clay loam

Redoximorphic features: common to many redoximorphic concentrations occurring as masses and linings along root channels (7.5YR 5/8)

Gypsum: 0 to 4 percent

Reaction: 7.4 to 9.0 (slightly to strongly alkaline)

Gila soils

Taxonomic classification: Coarse-loamy, mixed, superactive, calcareous, thermic Typic Torrifuvents

Geomorphic position: drainageways and a dynamic system of interbraided bars and channels

Parent material: mixed stream alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 5 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 85 percent

slightly decomposed litter: 90 percent

woody debris: 15 percent

bare soil: 0 percent

rock fragments: 0 percent

Drainage class: well drained

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Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 10.8 (very high)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: occasional

Runoff class: very low

Hydrologic group: B

Ecological site name: *Prosopis velutina*/*Sporobolus wrightii*

Ecological site number: F040XA124AZ

Present vegetation: tamarisk, mesquite, Fremont cottonwood, Gooding willow, velvet ash

Land capability (irrigated): 3w

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Winkelman; about 300 feet south and 850 feet west of the northeast corner of Section 36, Township 5 S, Range 15 E

Geographic Coordinate System:

32° 57' 51.00" north, 110° 45' 39.00" west

C1—0 to 5 inches (0 to 13 cm); pale brown (10YR 6/3) silt loam, brown (10YR 4/3), moist; 8 percent clay; moderate thick platy structure; soft, very friable, nonsticky and slightly plastic; few fine roots; few very fine interstitial pores; violently effervescent; slightly alkaline, pH 7.6; clear smooth boundary.

C2—5 to 24 inches (13 to 61 cm); pale brown (10YR 6/3) silt loam, brown (10YR 4/3), moist; 12 percent clay; massive; soft, very friable, nonsticky and slightly plastic; many fine and few medium and common coarse roots; few fine tubular pores; violently effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Cky1—24 to 31 inches (61 to 79 cm); brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3), moist; 34 percent clay; weak coarse subangular blocky structure; soft, very friable, moderately sticky and very plastic; common fine and coarse roots; few fine tubular pores; many fine carbonate and gypsum masses; violently effervescent; slightly alkaline, pH 7.6; clear smooth boundary.

Cky2—31 to 45 inches (79 to 114 cm); pale brown (10YR 6/3) silt loam, brown (10YR 4/3), moist; 16 percent clay; massive; slightly hard, friable, slightly sticky and moderately plastic; common coarse roots; few fine tubular pores; few fine carbonate and gypsum masses; violently effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Cky3—45 to 60 inches (114 to 152 cm); pale brown (10YR 6/3) silt loam, brown (10YR 4/3), moist; 12 percent clay; massive; soft, very friable, slightly sticky and moderately plastic; common coarse roots; few very fine tubular pores; few fine carbonate and gypsum masses; violently effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

Calcium carbonate equivalent: 0 to 4 percent

Gypsum: 0 to 4 percent

C and Cky horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: silt loam, very fine sandy loam, can have thin stratifications of finer or coarser textures

80—Ripsey-Rock outcrop complex, 15 to 70 percent slopes

Map Unit Setting

Landform(s): hills

Elevation: 2,400 to 3,600 feet (732 to 1,097 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Ripsey and similar soils: 55 percent

Rock outcrop: 30 percent

Minor components: Queencreek, Stagecoach, soils that have a clayey argillic over conglomerate

Soil Properties and Qualities

Ripsey soils

Taxonomic classification: Loamy, mixed, superactive, calcareous, thermic Lithic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from conglomerate

Slope: 15 to 70 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 60 percent

 cobble: 5 percent

Depth to restrictive feature(s): 6 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.20 inches per hour (0.00 to 1.40 micrometers per second)

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Available water capacity total inches: 1.2 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Conglomerate Hills 10–13" p.z.

Ecological site number: R040XA128AZ

Present vegetation: whitethorn, creosotebush, black grama, threeawn, pricklypear and cholla, bush muhly, jojoba, paloverde, ocotillo, hedgehog cactus, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Mammoth; about 300 feet west and 1,500 feet south of the northeast corner of Section 14, Township 9 S, Range 16 E

Geographic Coordinate System:

32° 39' 24.00" north, 110° 40' 24.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/3), moist; 12 percent clay; weak thin platy parting to weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few medium roots; few fine interstitial pores; 10 percent gravel; slightly effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk—1 inch to 11 inches (3 to 28 cm); brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/3), moist; 12 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few fine tubular pores; few fine and medium carbonate masses; 10 percent gravel; strongly effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

R—11 to 60 inches (28 to 152 cm); violently effervescent; unweathered conglomerate bedrock.

Range in Characteristics

Rock fragments: 0 to 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 10 to 20 percent

Calcium carbonate equivalent: 0 to 5 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 3 to 5 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: sandy loam, loamy sand

Bk horizons

Hue: 7.5YR

Value: 5 or 6 dry, 3 to 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loamy sand

R horizon

Conglomerate bedrock

Some pedons have thin weathered bedrock (Cr) above the unweathered bedrock.

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and near vertical cliffs of conglomerate (fanglomerate) bedrocks. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the summits.

81—Rock outcrop-Garzona family complex, 15 to 70 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 2,190 to 3,180 feet (667 to 969 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Rock outcrop: 50 percent

Garzona family and similar soils: 35 percent

Minor components: Garzona soils that are moderately deep

Soil Properties and Qualities

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of limestone bedrock. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Garzona family soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Lithic Haplocambids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from limestone

Slope: 15 to 70 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 10 percent

 bare soil: 25 percent

rock fragments

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gravel: 35 percent
cobble: 30 percent
stone: 5 percent
Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic
Drainage class: well drained
Ksat solum: 0.20 to 1.98 inches per hour (1.40 to 14.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 0.9 (very low)
Shrink-swell potential: about 4.5 LEP (moderate)
Flooding hazard: none
Runoff class: very high
Hydrologic group: D
Ecological site name: Limestone Hills 10–13" p.z.
Ecological site number: R040XA107AZ
Present vegetation: jojoba, creosotebush, paloverde, bush muhly, ocotillo, perennial forbs, range ratany, saguaro, wolfberry, barrel cactus
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Christmas; about 750 feet north and 4,445 feet east of the northeast corner of Section 9, Township 4 S, Range 16 E
Geographic Coordinate System:
33° 6' 30.90" north, 110° 41' 38.80" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/4) very gravelly loam, dark brown (7.5YR 3/3), moist; 25 percent clay; moderate thin platy parting to weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and few medium roots; many fine interstitial pores; 35 percent gravel and 5 percent cobble; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

Bk—2 to 12 inches (5 to 30 cm); brown (7.5YR 4/4) extremely cobbly clay loam, dark brown (7.5YR 3/4), moist; 35 percent clay; moderate fine and medium subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; many fine and common medium roots; many fine tubular pores; common discontinuous distinct carbonate coats on rock fragments; 35 percent gravel and 30 percent cobble; strongly effervescent, 7 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear wavy boundary.

R—12 to 60 inches (30 to 152 cm); unweathered limestone bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent
Reaction: 7.4 to 8.4 (slightly to moderately alkaline)
Average percent clay in the control section: 20 to 35 percent
Calcium carbonate equivalent: 0 to 10 percent

A horizon

Hue: 7.5YR, 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: sandy loam, loam

Bk horizon

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

Chroma: 3 or 4 dry or moist
Texture: clay loam, loam

R horizon
Limestone bedrock

Garzona as used in this mapping unit is at the family level. The Garzona series has basalt and volcanic bedrock.

82—Rock outcrop-Lajitas complex, 5 to 60 percent slopes

Map Unit Setting

Landform(s): mountains
Elevation: 2,000 to 3,200 feet (610 to 975 meters)
Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)
Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)
Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)
Frost-free period: 220 to 280 days
Major Land Resource Area: 40—Sonoran Basin and Range
Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Rock outcrop: 45 percent
Lajitas and similar soils: 35 percent

Minor components: Lehmans, Lajitas soils that contain more 25 percent clay in control section.

Soil Properties and Qualities

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of welded tuff and other related volcanic rocks. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Lajitas soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from volcanic rock

Slope: 5 to 60 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 15 percent

bare soil: 80 percent

rock fragments

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gravel: 15 percent
cobble: 65 percent
stone: 5 percent
Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic
Drainage class: well drained
Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)
Available water capacity total inches: 0.6 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very high
Hydrologic group: D
Ecological site name: Volcanic Hills 10–13" p.z.
Ecological site number: R040XA123AZ
Present vegetation: annual forbs, ocotillo, brittlebush, blue threeawn, flattop buckwheat, pricklypear and cholla, saguaro, false mesquite, paloverde, perennial forbs, slender janusia, triangle bursage
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Teapot Mountain; of Section 19,
Township 3 S, Range 12 E

Geographic Coordinate System:

33° 8' 48.30" north, 111° 3' 39.00" west

A1—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/3) very cobbly sandy loam, brown (7.5YR 4/3), moist; 10 percent clay; weak thin platy parting to weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; 15 percent gravel and 40 percent cobble; noneffervescent; neutral, pH 6.8; clear smooth boundary.

A2—1 inch to 11 inches (3 to 28 cm); brown (7.5YR 4/3) extremely cobbly loam, dark brown (7.5YR 3/3), moist; 20 percent clay; weak very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; 10 percent gravel and 50 percent cobble; noneffervescent; neutral, pH 7.0; abrupt wavy boundary.

R—11 to 60 inches (28 to 152 cm); unweathered welded tuff bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 10 to 25 percent

A horizons

Hue: 7.5YR, 5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sandy loam, loam

R horizon

Welded tuff and volcanic rocks

83—Rock outcrop-Lampshire complex, 10 to 60 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 3,400 to 4,400 feet (1,036 to 1,341 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Rock outcrop: 55 percent

Lampshire and similar soils: 30 percent

Minor components: Sontag, Eskiminzin, Lampshire soils that have calcium carbonate accumulations, soils that are clayey-skeletal and very deep

Soil Properties and Qualities

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and vertical cliffs of tuff and volcanic breccia. Rock outcrop also includes areas where the depth to bedrock is less than four inches.

Lampshire soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from welded tuff

Slope: 10 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 20 percent

 woody debris: 5 percent

 bare soil: 20 percent

rock fragments

 gravel: 50 percent

 cobble: 20 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Available water capacity total inches: 0.5 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Granitic Upland 12–16" p.z.

Ecological site number: R041XC322AZ

Present vegetation: agave, hedgehog cactus, whitethorn, bush muhly, mesquite, ocotillo, pricklypear and cholla, purple threeawn, range ratany, red brome

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Brandenburg Mountain; about 2,100 feet east and 1,900 feet north of the southwest corner of Section 6, Township 6 S, Range 18 E

Geographic Coordinate System:

32° 56' 1.00" north, 110° 32' 52.00" west

A—0 to 1 inch (0 to 3 cm); brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3), moist; 10 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few fine irregular pores; 40 percent gravel; noneffervescent; neutral, pH 6.8; clear smooth boundary.

C—1 inch to 7 inches (3 to 18 cm); brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3), moist; 15 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; few fine irregular pores; 40 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

R—7 to 60 inches (18 to 152 cm); unweathered tuff bedrock.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 10 to 20 percent

A and C horizons

Hue: 7.5YR

Value: 4 to 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

R horizon

Tuff bedrock

84—Rock outcrop-Lampshire complex, Chaparral, 5 to 50 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 3,090 to 4,480 feet (942 to 1,365 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 57 to 65 degrees F (13.9 to 18.3 degrees C)

Mean annual soil temperature: 59 to 67 degrees F (15.0 to 19.4 degrees C)

Frost-free period: 170 to 220 days
Major Land Resource Area: 38–Mogollon Transition
Land Resource Unit: 38–1 Lower Interior Chaparral

Map Unit Composition

Rock outcrop: 65 percent
Lampshire and similar soils: 30 percent
Minor components: Riverwash

Soil Properties and Qualities

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of welded tuff. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Lampshire soils

Taxonomic classification: Loamy, mixed, superactive, nonacid, thermic Lithic Ustic
Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from welded tuff

Slope: 5 to 50 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 75 percent

 woody debris: 20 percent

 bare soil: 5 percent

rock fragments

 cobble: 15 percent

 stone: 35 percent

 boulder: 35 percent

Depth to restrictive feature(s): 6 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 0.8 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Volcanic/Metamorphic Hills 12–16" p.z.

Ecological site number: R038XA133AZ

Present vegetation: juniper, turbinella oak, turpentine bush, sideoats grama, manzanita, mountain mahogany, hoptree, pinyon, Lehmann's lovegrass, plains lovegrass, perennial forbs

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Pinal Mountain; about 2,200 feet east and 500 feet south of the northwest corner of Section 14, Township 2 S, Range 13 E

Geographic Coordinate System:

33° 16' 0.60" north, 110° 59' 53.40" west

A1—0 to 1 inch (0 to 3 cm); brown (10YR 5/3) sandy loam, dark brown (10YR 3/3), moist; 10 percent clay; moderate thin and thick platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

A2—1 inch to 7 inches (3 to 18 cm); dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2), moist; 13 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and moderately plastic; many very fine and few medium roots; many very fine interstitial pores; 2 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

R—7 to 60 inches (18 to 152 cm); unweathered welded tuff bedrock.

Range in Characteristics

Rock fragments: 0 to 20 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 5 to 20 percent

A horizon

Hue: 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 to 4 dry, 2 or 3 moist

Texture: sandy loam, loam

R horizon

Welded tuff and volcanic bedrocks

Lampshire as used in this mapping unit is a taxadjunct to the series because particle size class is Loamy. Lampshire series is Loamy-skeletal, mixed, superactive, nonacid, thermic Lithic Ustic Torriorthents.

85—Rock outcrop-Stagecoach complex, 5 to 35 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,500 to 3,300 feet (762 to 1,006 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Rock outcrop: 45 percent

Stagecoach and similar soils: 30 percent

Minor components: Haplogypsiids, Delnorte, Ugyp, ash layers, Badlands

Soil Properties and Qualities

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and near vertical cliffs of diatomite bedrock. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas that have been mined or the surface alluvium (Stagecoach) removed by erosion.

Diatomite is a chalk-like, soft, friable, earthy, very fine grained siliceous sedimentary rock formed by the accumulations of highly porous shells of freshwater diatoms. It is very finely porous, very low in density, and essentially chemically inert in most liquids and gasses. These deposits have been mined off and on since the 1920's. Diatomite is used for filters, oil, water, and chemical absorbent, filler in paints and plastics, and many other uses.

Stagecoach soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Typic Haplocalcids

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 5 to 35 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 20 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 75 percent

 cobble: 10 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 3.5 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: A

Ecological site name: Limy Upland 10–13" p.z. Deep

Ecological site number: R040XA106AZ

Present vegetation: hedgehog cactus, annual grasses, black grama, creosotebush, paloverde, mormon tea, ocotillo, pricklypear and cholla, ratany, saguaro, Rothrock's grama, fluffgrass

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Clark Ranch; about 700 feet north and

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2,700 feet west of the southeast corner of Section 18, Township 9 S,
Range 18 E

Geographic Coordinate System:

32° 38' 41.00" north, 110° 32' 35.00" west

A—0 to 3 inches (0 to 8 cm); pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3), moist; 12 percent clay; weak thin platy parting to weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; few fine interstitial and tubular pores; many patchy distinct carbonate coats on bottom surfaces of rock fragments; 40 percent gravel; violently effervescent, 3 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk1—3 to 16 inches (8 to 41 cm); pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3), moist; 10 percent clay; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and common medium roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; 30 percent gravel and 15 percent cobble; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear wavy boundary.

Bk2—16 to 42 inches (41 to 107 cm); very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 4/3), moist; 7 percent clay; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; 50 percent gravel; violently effervescent, 15 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bk3—42 to 60 inches (107 to 152 cm); pale brown (10YR 6/3) very gravelly sand, dark yellowish brown (10YR 4/4), moist; 3 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and few medium roots; few fine interstitial pores; many patchy distinct carbonate coats on rock fragments; 45 percent gravel; violently effervescent, 7 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

Calcium carbonate equivalent: 0 to 5 percent

Bk horizons

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 2 to 4 dry, 3 to 6 moist

Texture: sandy loam, loam, loamy sand, sand

Calcium carbonate equivalent: 1 to 20 percent

Gypsum: 0 to 5 percent

These soils occur over diatomite (diatomaceous earth).

86—Rock outcrop-Surge complex, 3 to 45 percent slopes

Map Unit Setting

Landform(s): Hills and lava flows

Elevation: 3,600 to 4,200 feet (1,097 to 1,280 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Rock outcrop: 60 percent

Surge and similar soils: 30 percent

Minor components: Sontag, soils greater than 20 inches deep, soils that are shallow and contain more than 35 percent clay

Soil Properties and Qualities

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges, boulder piles, and nearly vertical cliffs of basalt and volcanic breccia. Rock outcrop also includes areas where the depth to bedrock is less than four inches.

Surge soils

Taxonomic classification: Loamy, mixed, superactive, nonacid, thermic Lithic Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from basalt

Slope: 3 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 10 percent

 bare soil: 60 percent

rock fragments: 0 percent

Depth to restrictive feature(s): 8 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.01 inches per hour (0.00 to 0.07 micrometers per second)

Available water capacity total inches: 1.4 (very low)

Shrink-swell potential: about 1.5 LEP (low)

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Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Granitic Upland 12–16" p.z.

Ecological site number: R041XC322AZ

Present vegetation: sideoats grama, slender grama, hairy grama, sand dropseed, pricklypear and cholla, cane beardgrass, mimosa, snakeweed, spidergrass, catclaw acacia, plains lovegrass, sotol, oneseed juniper, purple grama, shrubby buckwheat

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oak Grove Canyon; about 1,400 feet east and 1,200 feet south of the north west corner of Section 35, Township 6 S, Range 18 E

Geographic Coordinate System:

32° 52' 35.50" north, 110° 28' 44.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 4/4) sandy loam, very dark brown (7.5YR 2.5/3), moist; 12 percent clay; moderate very fine and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine irregular pores; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

C—1 inch to 13 inches (3 to 33 cm); brown (7.5YR 4/4) sandy loam, very dark brown (7.5YR 2.5/3), moist; 15 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; noneffervescent; neutral, pH 6.8; abrupt wavy boundary.

R—13 to 60 inches (33 to 152 cm); unweathered volcanic breccia bedrock.

Range in Characteristics

Rock fragments: 5 to 15 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 10 to 18 percent

A and C horizons

Hue: 7.5YR

Value: 4 or 5 dry, 2.5 to 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

R horizon

Volcanic breccia and basalt bedrock

Surge as used in this mapping unit is a taxadjunct to the series because it is nonacid.

Surge series is Loamy, mixed, superactive, calcareous, thermic Lithic Torriorthents.

87—Romero-Rock outcrop-Oracle complex, 10 to 45 percent slopes

Map Unit Setting

Landform(s): hills, mountains

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Elevation: 3,400 to 4,500 feet (1,036 to 1,372 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41–Southeastern Arizona Basin and Range

Land Resource Unit: 41–3 Southern Arizona Semidesert Grassland

Map Unit Composition

Romero and similar soils: 50 percent

Rock outcrop: 25 percent

Oracle and similar soils: 20 percent

Minor components: Romero soils that have less than 35 percent rock fragments, Chiricahua, Combate, White House, Kimrose, slopes that are less than 10 percent

Soil Properties and Qualities

Romero soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic, shallow Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 10 to 25 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 50 percent

 cobble: 5 percent

Depth to restrictive feature(s): 7 to 20 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.8 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Granitic Hills 12–16" p.z.

Ecological site number: R041XC306AZ

Present vegetation: black grama, false mesquite, hairy grama, shrubby buckwheat, sideoats grama, slender grama, threeawn, cane beardgrass, catclaw acacia, ratany, tanglehead, pricklypear and cholla, bush muhly

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle north of Oracle; about 900 feet east and 1,900 feet north of the southwest corner of Section 18, Township 8 S, Range 16 E

Geographic Coordinate System:

32° 44' 13.00" north, 110° 45' 16.00" west

A1—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 3/2), moist; 15 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 40 percent gravel; noneffervescent; slightly acid, pH 6.1; abrupt smooth boundary.

A2—1 inch to 12 inches (3 to 30 cm); brown (7.5YR 4/4) very gravelly sandy loam, very dark brown (7.5YR 2.5/2), moist; 16 percent clay; weak very fine and fine subangular blocky parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; few medium roots; common very fine interstitial pores; 40 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt wavy boundary.

Cr—12 to 60 inches (30 to 152 cm); weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizons

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 3 or 4 dry, 2 or 3 moist

Texture: sandy loam, coarse sandy loam

Cr horizon

Granite and granodiorite bedrocks

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of granite and granodiorite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Oracle soils

Taxonomic classification: Loamy, mixed, superactive, thermic, shallow Ustic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 10 to 30 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

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Chemical crust
 salt: 0 percent
 gypsum: 0 percent
Physical cover
 canopy plant cover: 60 percent
 woody debris: 5 percent
 bare soil: 3 percent
rock fragments
 gravel: 50 percent
 cobble: 10 percent
Depth to restrictive feature(s): 5 to 20 inches to bedrock, paralithic
Drainage class: well drained
Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 2.0 (very low)
Shrink-swell potential: about 4.5 LEP (moderate)
Flooding hazard: none
Runoff class: very high
Hydrologic group: C
Ecological site name: Granitic Hills 12–16" p.z.
Ecological site number: R041XC306AZ
Present vegetation: black grama, false mesquite, hairy grama, shrubby buckwheat, sideoats grama, slender grama, threeawn, cane beardgrass, catclaw acacia, ratany, tanglehead, pricklypear and cholla, yucca, bush muhly, mesquite, sacahuista
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle north of Oracle; about 350 feet east and 2,100 feet north of the southwest corner of Section 18, Township 8 S, Range 16 E

Geographic Coordinate System:

32° 44' 13.00" north, 110° 45' 21.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/4) gravelly coarse sandy loam, brown (7.5YR 4/4), moist; 15 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine interstitial pores; 24 percent gravel; noneffervescent; slightly acid, pH 6.1; abrupt smooth boundary.

Bt1—1 inch to 9 inches (3 to 23 cm); reddish brown (5YR 4/4) sandy clay loam, yellowish red (5YR 4/6), moist; 35 percent clay; strong fine and medium subangular blocky structure; very hard, firm, moderately sticky and moderately plastic; common very fine and few medium roots; common very fine tubular and interstitial pores; common continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; slightly acid, pH 6.4; clear wavy boundary.

Bt2—9 to 14 inches (23 to 36 cm); reddish brown (5YR 4/4) gravelly sandy clay loam, yellowish red (5YR 4/6), moist; 33 percent clay; strong fine and medium subangular blocky structure; very hard, firm, moderately sticky and moderately plastic; few very fine and medium roots between peds; common very fine tubular and interstitial pores; common continuous distinct clay films on faces of peds and rock fragments; 24 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

Crt—14 to 60 inches (36 to 152 cm); common continuous distinct clay films on bedrock; weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 0 to 25 percent

Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, coarse sandy loam

Bt horizons

Hue: 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 4 to 6 moist

Texture: sandy clay loam, clay loam

Crt horizon

Granite and granodiorite bedrocks

88—Sasabe-Stronghold complex, 1 to 15 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 3,290 to 3,890 feet (1,003 to 1,186 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Sasabe and similar soils: 45 percent

Stronghold and similar soils: 35 percent

Minor components: Kimrose, White House, Combate, Tombstone, Riverwash, soils containing 18 to 35 percent clay

Soil Properties and Qualities

Sasabe soils

Taxonomic classification: Fine, mixed, superactive, thermic Ustic Paleargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 8 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Chemical crust
 salt: 0 percent
 gypsum: 0 percent
Physical cover
 canopy plant cover: 45 percent
 woody debris: 5 percent
 bare soil: 40 percent
rock fragments
 gravel: 15 percent
Drainage class: well drained
Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)
Available water capacity total inches: 10.0 (high)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none
Runoff class: medium
Hydrologic group: C
Ecological site name: Loamy Upland 12–16" p.z.
Ecological site number: R041XC313AZ
Present vegetation: pricklypear and cholla, yucca, snakeweed, mesquite, bush muhly, burroweed, barrel cactus, range ratany, Lehmann's lovegrass, catclaw acacia, purple threeawn, cane beardgrass
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Fortified Peak; about 2,150 feet east and 350 feet north of the southwest corner of Section 33, Township 8 S, Range 14 E

Geographic Coordinate System:

32° 41' 14.00" north, 110° 54' 21.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/4) sandy loam, dark brown (7.5YR 3/3), moist; 19 percent clay; weak thin platy parting to moderate very fine and fine subangular blocky structure; soft, very friable, slightly sticky and moderately plastic; few very fine roots; many fine irregular pores; 5 percent gravel; noneffervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bt1—2 to 15 inches (5 to 38 cm); reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4), moist; 39 percent clay; strong very fine and fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; few very fine and few medium roots; few fine tubular pores; very few patchy distinct organic stains on faces of peds; common continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 7.2; clear smooth boundary.

Bt2—15 to 44 inches (38 to 112 cm); yellowish red (5YR 4/6) clay, dark reddish brown (5YR 3/4), moist; 48 percent clay; strong coarse prismatic parting to strong fine and medium angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few fine tubular pores; few patchy distinct organic stains on faces of peds; many continuous distinct clay films on faces of peds and rock fragments; many pressure faces; 10 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Btk—44 to 60 inches (112 to 152 cm); reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4), moist; 36 percent clay; strong fine and medium angular blocky structure; very hard, very firm, very sticky and very plastic; few fine tubular pores; few

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patchy distinct organic stains on faces of peds; many continuous distinct clay films on faces of peds and rock fragments; common very fine and fine carbonate masses; 5 percent gravel; strongly effervescent; moderately alkaline, pH 8.4.

Range in Characteristics

Rock fragments: 0 to 15 percent

Reaction: 6.6 to 8.4 (neutral to moderately alkaline)

Average percent clay in the control section: 35 to 50 percent

A horizon

Hue: 2.5YR, 5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 to 6 moist

Texture: sandy loam, sandy clay loam

Bt and Btk horizons

Hue: 2.5YR, 5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 to 6 moist

Texture: sandy clay loam, clay, clay loam

Stronghold soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Ustic Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 1 to 15 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 45 percent

woody debris: 5 percent

bare soil: 40 percent

rock fragments

gravel: 15 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 6.4 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: B

Ecological site name: Limy Upland 12–16" p.z.

Ecological site number: R041XC309AZ

Present vegetation: pricklypear and cholla, snakeweed, bush muhly, paperflower, mesquite, yucca, burroweed, fluffgrass, barrel cactus, Mormon tea, catclaw acacia, threeawn

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Fortified Peak; about 2,000 feet east and 400 feet north of the southwest corner of Section 33, Township 8 S, Range 14 E

Geographic Coordinate System:

32° 41' 14.00" north, 110° 54' 22.00" west

A—0 to 2 inches (0 to 5 cm); brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4), moist; 14 percent clay; weak thin platy parting to weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine irregular pores; 10 percent gravel; violently effervescent, 2 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Bk1—2 to 17 inches (5 to 43 cm); yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 3/3), moist; 18 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few medium roots; common very fine irregular pores; common continuous distinct carbonate coats on rock fragments; many very fine and fine carbonate masses; 10 percent gravel; violently effervescent, 5 percent calcium carbonate equivalent; moderately alkaline, pH 8.4; abrupt smooth boundary.

Bk2—17 to 41 inches (43 to 104 cm); very pale brown (10YR 7/3) gravelly loam, pale brown (10YR 6/3), moist; 18 percent clay; massive; slightly hard, friable, nonsticky and moderately plastic; few medium roots; common very fine irregular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate masses; 20 percent gravel; violently effervescent, 19 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt smooth boundary.

Bk3—41 to 60 inches (104 to 152 cm); very pale brown (10YR 7/3) gravelly sandy loam, yellowish brown (10YR 5/4), moist; 8 percent clay; massive; hard, firm, nonsticky and nonplastic; common very fine tubular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate masses; 20 percent gravel; violently effervescent, 25 percent calcium carbonate equivalent; moderately alkaline, pH 8.4.

Range in Characteristics

Rock fragments: 5 to 30 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 10 to 20 percent

A horizon

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3 dry, 2 to 4 moist

Texture: sandy loam

Bk horizons

Hue: 7.5YR, 10YR

Value: 4 to 7 dry, 3 to 6 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: sandy loam, loam

Calcium carbonate equivalent: 5 to 30 percent

89—Schiefflin-Rock outcrop complex, 5 to 45 percent slopes

Map Unit Setting

Landform(s): hills, mountains
Elevation: 3,610 to 5,200 feet (1,100 to 1,585 meters)
Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)
Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)
Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)
Frost-free period: 180 to 230 days
Major Land Resource Area: 41—Southeastern Arizona Basin and Range
Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Schiefflin and similar soils: 60 percent
Rock outcrop: 30 percent

Minor components: Mabray, Lampshire, Schiefflin soils that contain calcium carbonate

Soil Properties and Qualities

Schiefflin soils

Taxonomic classification: Mixed, thermic, shallow Ustic Torripsamments
Geomorphic position: generally on summits and backslopes
Parent material: slope alluvium and/or residuum weathered from granite
Slope: 5 to 45 percent
Surface cover:

- Biological crust
 - cyanobacteria: 0 percent
 - lichen: 0 percent
 - moss: 0 percent
- Chemical crust
 - salt: 0 percent
 - gypsum: 0 percent
- Physical cover
 - canopy plant cover: 30 percent
 - woody debris: 5 percent
 - bare soil: 10 percent

rock fragments

- gravel: 30 percent
- cobble: 20 percent
- stone: 10 percent

Depth to restrictive feature(s): 8 to 20 inches to bedrock, paralithic
Drainage class: somewhat excessively drained
Ksat solum: 5.95 to 19.98 inches per hour (42.00 to 141.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 0.8 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very high
Hydrologic group: C
Ecological site name: Granitic Hills 12-16" p.z.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site number: R041XC306AZ

Present vegetation: annual forbs, desert lavender, perennial forbs, pricklypear and cholla, annual grasses, perennial grasses, brittlebush, paloverde, oneseed juniper, agave, Lehmann's lovegrass, barrel cactus

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Holy Joe Peak; about 2,900 feet east and 1,100 feet south of the northwest corner of Section 31, Township 7 S, Range 18 E

Geographic Coordinate System:

32° 47' 8.00" north, 110° 32' 40.00" west

C1—0 to 1 inch (0 to 3 cm); yellowish brown (10YR 5/4) very cobbly loamy sand, dark brown (10YR 3/3), moist; 10 percent clay; single grain; loose, nonsticky and nonplastic; common very fine roots; common fine interstitial pores; 50 percent cobble; noneffervescent; slightly acid, pH 6.4; clear smooth boundary.

C2—1 inch to 12 inches (3 to 30 cm); yellowish brown (10YR 5/4) sand, dark brown (10YR 3/3), moist; 7 percent clay; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and many medium roots; common fine interstitial pores; noneffervescent; neutral, pH 6.6; abrupt wavy boundary.

Cr—12 to 60 inches (30 to 152 cm); weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 5 to 10 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 2 to 15 percent

C horizons

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 5 moist

Chroma: 3 or 4 dry, 2 to 4 moist

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

Cr horizon

Granite and granodiorite

Schiefflin as used in this mapping unit is a taxadjunct to the series because this soil does not contain lithic contact within 20 inches. Schiefflin series is mixed, thermic, Lithic Torripsamments.

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of granite and granodiorite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

90—Schrap-Rock outcrop complex, 5 to 60 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Elevation: 3,400 to 4,600 feet (1,036 to 1,402 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41–Southeastern Arizona Basin and Range

Land Resource Unit: 41–3 Southern Arizona Semidesert Grassland

Map Unit Composition

Schrap and similar soils: 60 percent

Rock outcrop: 25 percent

Minor components: Lampshire, Mabray, Romero, Schrap with less than 35 percent rock fragments, Schrap with calcium carbonate accumulations

Soil Properties and Qualities

Schrap soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic, shallow Ustic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from schist

Slope: 5 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 channer: 60 percent

 flagstone: 20 percent

 stone: 10 percent

Depth to restrictive feature(s): 5 to 20 inches to bedrock, paralithic; 15 to 40 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 19.98 inches per hour (0.00 to 141.00 micrometers per second)

Available water capacity total inches: 0.7 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: high

Hydrologic group: D

Ecological site name: Granitic Hills 12–16" p.z.

Ecological site number: R041XC306AZ

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Present vegetation: black grama, sideoats grama, cane beardgrass, false mesquite, tanglehead, Arizona cottontop, bush muhly, slender grama, sprucetop grama, threeawn, range ratany, ocotillo, jojoba, pricklypear and cholla
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Holy Joe Peak; about 1,900 feet east and 2,300 feet south of the northwest corner of Section 13, Township 7 S, Range 17 E

Geographic Coordinate System:

32° 49' 27.30" north, 110° 33' 49.82" west

A—0 to 1 inch (0 to 3 cm); yellowish brown (10YR 5/4) very channery sandy loam, brown (10YR 4/3), moist; 13 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine interstitial pores; very few distinct organic stains on rock fragments; 45 percent channers; noneffervescent; neutral, pH 6.8; clear smooth boundary.

C1—1 inch to 6 inches (3 to 15 cm); yellowish brown (10YR 5/4) very channery sandy clay loam, brown (10YR 4/3), moist; 22 percent clay; weak medium subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine and fine and few medium roots; few fine tubular pores; very few distinct organic stains on rock fragments; 40 percent channers and 15 percent flagstones; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

C2—6 to 11 inches (15 to 28 cm); yellowish brown (10YR 5/4) extremely channery loam, brown (10YR 4/3), moist; 21 percent clay; weak very fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; few fine tubular pores; 40 percent channers and 25 percent flagstones; noneffervescent; neutral, pH 6.8; gradual smooth boundary.

Cr—11 to 32 inches (28 to 81 cm); weathered schist bedrock.

R—32 to 60 inches (81 to 152 cm); unweathered schist bedrock.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Average percent clay in the control section: 18 to 30 percent

A and C horizons

Hue: 10YR, 7.5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 2 to 4 moist

Texture: sandy loam, loam, sandy clay loam, clay loam

Cr and R horizons

Schist bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of schist. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

91—Selevin-Tombstone-Saddlebrook complex, 3 to 45 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 3,200 to 3,900 feet (975 to 1,189 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 60 to 67 degrees F (15.5 to 19.4 degrees C)

Mean annual soil temperature: 62 to 69 degrees F (16.6 to 20.5 degrees C)

Frost-free period: 180 to 230 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-3 Southern Arizona Semidesert Grassland

Map Unit Composition

Selevin and similar soils: 35 percent

Tombstone and similar soils: 35 percent

Saddlebrook and similar soils: 20 percent

Minor components: Kimrose, Stronghold, Riverwash, White House, slopes greater than 45 percent, Urbanland (Saddlebrook)

Soil Properties and Qualities

Selevin soils

Taxonomic classification: Clayey-skeletal, mixed, superactive, thermic Calcic Paleargids

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 10 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 65 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 50 percent

 cobble: 10 percent

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Available water capacity total inches: 3.6 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Loamy Slopes 12-16" p.z.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ecological site number: R041XC314AZ

Present vegetation: sideoats grama, false mesquite, Arizona cottontop, pricklypear and cholla, slender grama, tanglehead, threeawn, perennial forbs, slender janusia, paloverde, mesquite, Rothrock's grama, brittlebush, catclaw acacia, netleaf hackberry, ocotillo

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oracle Junction; about 500 feet east and 1,000 feet south of the northwest corner of Section 23, Township 10 S, Range 14 E

Geographic Coordinate System:

32° 33' 33.00" north, 110° 52' 15.00" west

A—0 to 4 inches (0 to 10 cm); dark brown (7.5YR 3/4) gravelly sandy clay loam, dark brown (7.5YR 3/2), moist; 27 percent clay; weak thin platy parting to weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few medium and coarse roots; many very fine irregular pores; 20 percent gravel and 5 percent cobble; noneffervescent; neutral, pH 7.2; abrupt smooth boundary.

Bt—4 to 15 inches (10 to 38 cm); strong brown (7.5YR 4/6) very gravelly clay, brown (7.5YR 4/4), moist; 47 percent clay; strong fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine and few coarse roots; common very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 45 percent gravel and 10 percent cobble; noneffervescent; slightly acid, pH 6.2; abrupt smooth boundary.

Btk1—15 to 25 inches (38 to 64 cm); strong brown (7.5YR 4/6) extremely gravelly clay, brown (7.5YR 4/4), moist; 42 percent clay; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; common very fine and few medium and coarse roots; many very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; few continuous distinct carbonate coats on rock fragments; few medium carbonate masses; 50 percent gravel and 10 percent cobble; violently effervescent, 8 percent calcium carbonate equivalent; neutral, pH 7.0; clear wavy boundary.

Btk2—25 to 60 inches (64 to 152 cm); strong brown (7.5YR 5/6) extremely gravelly sandy clay loam, strong brown (7.5YR 4/6), moist; 20 percent clay; moderate fine and medium subangular blocky structure; slightly hard, firm, moderately sticky and moderately plastic; few very fine and few medium roots; common very fine irregular pores; few continuous distinct clay films on faces of peds and rock fragments; common continuous distinct carbonate coats on rock fragments; many medium carbonate masses; 50 percent gravel and 10 percent cobble; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 25 to 60 percent, averages more than 35 percent

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR, 10YR

Value: 3 to 5 dry, 2 to 4 moist

Chroma: 2 to 4, dry or moist

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Texture: loam, clay loam, sandy clay loam
Reaction: 6.1 to 7.3 (slightly acid to neutral)

Bt horizons

Hue: 7.5YR, 5YR
Value: 3 to 5 dry, 2 to 4 moist
Chroma: 2 to 6 dry, 2 to 5 moist
Texture: clay, clay loam, sandy clay loam, sandy clay
Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)
Calcium carbonate equivalent: 5 to 25 percent

Btk horizons

Hue: 7.5YR, 5YR
Value: 3 to 5, dry or moist
Chroma: 4 to 6 dry, 3 to 6 moist
Texture: clay, clay loam, sandy clay loam, sandy clay
Reaction: 6.6 to 8.4 (neutral to moderately alkaline)
Calcium carbonate equivalent: 5 to 40 percent

Some pedons are very weakly cemented.

Tombstone soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Ustic
Haplocalcids

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 10 to 45 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 60 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 50 percent

cobble: 10 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 4.2 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: low

Hydrologic group: A

Ecological site name: Limy Slopes 12–16" p.z.

Ecological site number: R041XC308AZ

Present vegetation: black grama, false mesquite, sideoats grama, brittlebush, bush
muhly, whitethorn, paloverde, perennial forbs, slim tridens, pricklypear and cholla,
ocotillo, netleaf hackberry, tanglehead, threeawn, wolfberry

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oracle Junction; about 450 feet east and 600 feet south of the northwest corner of Section 23, Township 10 S, Range 14 E

Geographic Coordinate System:

32° 33' 35.00" north, 110° 52' 15.00" west

A—0 to 3 inches (0 to 8 cm); brown (10YR 4/3) very gravelly sandy loam, dark brown (10YR 3/3), moist; 13 percent clay; weak thin platy parting to weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine roots; many very fine irregular pores; few continuous distinct carbonate coats on rock fragments; 45 percent gravel and 5 percent cobble; violently effervescent, 6 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk1—3 to 27 inches (8 to 69 cm); brown (10YR 5/3) very gravelly sandy loam, dark grayish brown (10YR 4/2), moist; 15 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common very fine and few medium roots; many very fine irregular and few medium tubular pores; few continuous distinct carbonate coats on rock fragments; few medium carbonate masses; 50 percent gravel and 5 percent cobble; violently effervescent, 14 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—27 to 60 inches (69 to 152 cm); pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3), moist; 15 percent clay; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few medium roots; many very fine irregular and few medium tubular pores; few continuous distinct carbonate coats on rock fragments; many medium carbonate masses; 50 percent gravel and 5 percent cobble; violently effervescent, 20 percent calcium carbonate equivalent; moderately alkaline, pH 8.2.

Range in Characteristics

Rock fragments: 35 to 60 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 2 or 3 moist

Texture: sandy loam, coarse sandy loam

Bk horizons

Hue: 10YR

Value: 5 or 6 dry, 3 to 5 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam, loam, coarse sandy loam

Calcium carbonate equivalent: 5 to 35 percent

Some pedons are weakly cemented.

Saddlebrook soils

Taxonomic classification: Clayey, mixed, superactive, thermic, shallow Ustalfic Petrocalcids

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 3 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 85 percent

 woody debris: 5 percent

 bare soil: 3 percent

rock fragments

 gravel: 20 percent

 cobble: 5 percent

Depth to restrictive feature(s): 8 to 20 inches to petrocalcic

Drainage class: well drained

Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.4 (very low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: high

Hydrologic group: D

Ecological site name: Clay Loam Upland 12–16" p.z.

Ecological site number: R041XC305AZ

Present vegetation: sideoats grama, tobosa, Pima peppergrass, Rothrock's grama, threeawn, catclaw acacia, javelin bush, pricklypear and cholla, mesquite, condole, false mesquite, ocotillo, ratany

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oracle Junction; about 200 feet south and 250 feet east of the northwest corner of Section 23, Township 10 S, Range 14 E

Geographic Coordinate System:

32° 33' 38.00" north, 110° 52' 18.00" west

A—0 to 2 inches (0 to 5 cm); strong brown (7.5YR 5/6) loam, dark brown (7.5YR 3/4), moist; 20 percent clay; weak thin platy parting to weak very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; 10 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt smooth boundary.

Bt—2 to 9 inches (5 to 23 cm); dark red (2.5YR 3/6) clay, dark reddish brown (2.5YR 3/4), moist; 50 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; many very fine roots; many very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 3 percent gravel; noneffervescent; slightly acid, pH 6.4; clear smooth boundary.

Btk—9 to 16 inches (23 to 41 cm); dark reddish brown (2.5YR 3/4) clay, dark reddish

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brown (2.5YR 3/4), moist; 72 percent clay; strong fine and medium angular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; many very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; few continuous distinct carbonate coats on rock fragments; few finecarbonate filaments; 5 percent gravel; strongly effervescent, 8 percent calcium carbonate equivalent; neutral, pH 6.8; abrupt wavy boundary.

Bkm—16 to 60 inches (41 to 152 cm); cemented material, indurated; petrocalcic.

Range in Characteristics

Rock fragments: 0 to 20 percent

Reaction: 6.1 to 7.8 (slightly acid to slightly alkaline)

Average percent clay in the control section: 40 to 65 percent

A horizon

Hue: 5YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy loam, loam

B horizons

Hue: 5YR, 2.5YR

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 3 to 6 dry, 2 to 4 moist

Texture: clay, clay loam, sandy clay loam

Calcium carbonate equivalent: 0 to 15 percent

Bkm horizons

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 6 feet; continuous

92—Stagecoach-Delnorte complex, 5 to 45 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,000 to 3,100 feet (610 to 945 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Stagecoach and similar soils: 55 percent

Delnorte and similar soils: 35 percent

Minor components: Riverwash, Kokan, Nadha, Ripsey

Soil Properties and Qualities

Stagecoach soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Typic

Haplocalcids

Geomorphic position: backslopes

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Parent material: mixed fan alluvium

Slope: 20 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 0 percent

 bare soil: 10 percent

rock fragments

 gravel: 55 percent

 cobble: 25 percent

 stone: 5 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 2.4 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: medium

Hydrologic group: A

Ecological site name: Limy Slopes 10–13" p.z.

Ecological site number: R040XA110AZ

Present vegetation: annual forbs, paloverde, saguaro, triangle bursage, creosotebush, perennial forbs, ocotillo, fishhook barrel cactus, range ratany, brittlebush

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Dudleyville; about 2,450 west and 1,350 feet south of the northeast corner of Section 30, Township 5 S, Range 16 E

Geographic Coordinate System:

32° 58' 19.90" north, 110° 44' 55.00" west

A—0 to 6 inches (0 to 15 cm); brown (10YR 5/3) extremely cobbly sandy loam, brown (10YR 4/3), moist; 12 percent clay; weak very thin platy parting to weak very fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine tubular pores; many continuous distinct carbonate coats on rock fragments; 35 percent gravel and 25 percent cobble; violently effervescent, 5 percent calcium carbonate equivalent; slightly alkaline, pH 7.6; abrupt wavy boundary.

Bk1—6 to 19 inches (15 to 48 cm); pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3), moist; 12 percent clay; weak very fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine tubular pores; many continuous distinct carbonate coats on rock fragments; 25 percent gravel and 35 percent cobble; violently effervescent, 16 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Bk2—19 to 48 inches (48 to 122 cm); light brownish gray (10YR 6/2) extremely gravelly sandy loam, brown (10YR 5/3), moist; 12 percent clay; weak very fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine tubular pores; many continuous distinct carbonate coats on rock fragments; 45 percent gravel and 20 percent cobble; violently effervescent, 16 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk3—48 to 60 inches (122 to 152 cm); pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3), moist; 10 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; many continuous distinct carbonate coats on rock fragments; 45 percent gravel and 20 percent cobble; violently effervescent, 11 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 7.4 to 8.4 (slightly alkaline to moderately alkaline)

Average percent clay in the control section: 7 to 18 percent

Calcium carbonate equivalent: 5 to 20 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sandy loam

Bk horizons

Hue: 7.5YR, 10YR

Value: 6 or 7 dry, 3 to 6 moist

Chroma: 2 or 3 dry, 3 or 4 moist

Texture: sandy loam, loam

Delnorte soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 5 to 25 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 20 percent

bare soil: 5 percent

rock fragments

gravel: 75 percent

cobble: 20 percent

Depth to restrictive feature(s): 6 to 20 inches to petrocalcic

Drainage class: somewhat excessively drained

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.9 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Slopes 10–13" p.z.

Ecological site number: R040XA110AZ

Present vegetation: creosotebush, annual forbs, ocotillo, triangle bursage, saguaro, paloverde

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Dudleyville; about 2,200 feet west and 550 feet south of the northeast corner of Section 30, Township 5 S, Range 16 E

Geographic Coordinate System:

32° 58' 27.30" north, 110° 44' 50.40" west

A—0 to 1 inch (0 to 3 cm); light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2), moist; 10 percent clay; weak very thin platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 35 percent gravel and 10 percent cobble; violently effervescent, 8 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk—1 inch to 13 inches (3 to 33 cm); pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3), moist; 12 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few medium roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate masses; 15 percent gravel and 40 percent cobble; violently effervescent, 18 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

Bkm—13 to 60 inches (33 to 152 cm); extremely hard; violently effervescent; cemented material, thin laminar cap; indurated; petrocalcic.

Range in Characteristics

Rock fragments: 35 to 70 percent

Reaction: 7.4 to 8.4 (slightly alkaline to moderately alkaline)

Average percent clay in the control section: 7 to 18 percent

Calcium carbonate equivalent: 5 to 20 percent

A horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam

Bk horizons

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 3 feet; continuous

93—Stagecoach-Haplogypsids-Delnorte complex, 5 to 80 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,000 to 3,200 feet (610 to 975 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Stagecoach and similar soils: 40 percent

Haplogypsids and similar soils: 30 percent

Delnorte and similar soils: 15 percent

Minor components: Nahda, Topawa, Contine, Rillino, Riverwash, Queencreek, Whitecliff, Ugyp, Contention, Haplogypsids that have pH greater than 9.0, Badlands, soils that have consolidated (diatomite and calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials

Soil Properties and Qualities

Stagecoach soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Typic

Haplocalcids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan alluvium

Slope: 5 to 45 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 5 percent

bare soil: 25 percent

rock fragments

gravel: 40 percent

cobble: 10 percent

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Available water capacity total inches: 3.6 (low)

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Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: medium
Hydrologic group: A
Ecological site name: Limy Upland 10–13" p.z. Deep
Ecological site number: R040XA106AZ
Present vegetation: Christmas cactus, annual grasses, catclaw acacia, creosotebush, paloverde, mesquite, pricklypear and cholla, saguaro
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Mammoth; about 2,000 feet south and 300 feet east of the northwest corner of Section 17, Township 8 S, Range 17 E

Geographic Coordinate System:
32° 44' 20.00" north, 110° 38' 12.00" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/3) gravelly fine sandy loam, dark brown (7.5YR 3/4), moist; 7 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine irregular pores; 30 percent gravel; violently effervescent, 1 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk1—2 to 38 inches (5 to 97 cm); light brown (7.5YR 6/3) very gravelly sandy loam, brown (7.5YR 4/3), moist; 10 percent clay; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and few medium roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; many fine and medium carbonate masses; 45 percent gravel; violently effervescent, 13 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—38 to 60 inches (97 to 152 cm); light brown (7.5YR 6/3) very gravelly loamy sand, brown (7.5YR 4/3), moist; 5 percent clay; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; 45 percent gravel and 10 percent cobble; violently effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Range in Characteristics

Rock fragments: 35 to 60 percent, averages more than 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 20 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loamy sand, fine sandy loam

Bk horizons

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 3 to 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loamy sand

Calcium carbonate equivalent: 5 to 25 percent

Gypsum: 0 to 5 percent

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These soils occur over consolidated (diatomite and calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials.

Haplogypsids soils

Taxonomic classification: Haplogypsids

Geomorphic position: backslopes

Parent material: gypsiferous and calcareous lacustrine deposits

Slope: 20 to 80 percent

Surface cover:

Biological crust

 cyanobacteria: 30 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 10 percent (crystals)

Physical cover

 canopy plant cover: 25 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 20 percent

 cobble: 5 percent

Depth to restrictive feature(s): 30 to 48 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 4.6 (low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: B

Ecological site name: Gypsum Upland 10–13" p.z.

Ecological site number: R040XA126AZ

Present vegetation: hedgehog cactus, whitethorn, annual grasses, catclaw acacia, creosotebush, paloverde, mesquite, mormon tea, ocotillo, pricklypear and cholla

Land capability (non irrigated): 8

Typical Profile

Location

Public Land Survey: USGS Quadrangle Mammoth; about 1,400 feet south and 1,200 feet east of the northwest corner of Section 17, Township 8 S, Range 17 E

Geographic Coordinate System:

32° 44' 34.00" north, 110° 37' 50.00" west

Bky1—0 to 2 inches (0 to 5 cm); light gray (10YR 7/2) loam, light yellowish brown (10YR 6/4), moist; 10 percent clay; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many fine vesicular pores; many fine and medium gypsum crystals; noneffervescent, 38 percent gypsum; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bky2—2 to 18 inches (5 to 46 cm); very pale brown (10YR 7/3) sandy loam, yellowish brown (10YR 5/4), moist; 5 percent clay; weak medium subangular blocky structure;

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soft, very friable, nonsticky and nonplastic; common very fine roots; many fine tubular pores; many fine carbonate and gypsum masses; many fine and medium gypsum crystals; strongly effervescent, 33 percent gypsum; slightly alkaline, pH 7.6; abrupt smooth boundary.

Bky3—18 to 26 inches (46 to 66 cm); pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4), moist; 8 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine tubular pores; few very fine carbonate and gypsum masses; many very fine gypsum crystals; strongly effervescent, 1 percent calcium carbonate equivalent and 38 percent gypsum; slightly alkaline, pH 7.8; clear smooth boundary.

Bky4—26 to 42 inches (66 to 107 cm); brown (10YR 5/3) loam, dark yellowish brown (10YR 4/4), moist; 18 percent clay; strong thin and medium platy structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; few fine tubular pores; many very fine gypsum crystals; violently effervescent, 10 percent calcium carbonate equivalent and 33 percent gypsum; moderately alkaline, pH 8.0; abrupt smooth boundary.

R—42 to 48 inches (107 to 122 cm); extremely hard; strongly effervescent, 75 percent gypsum; unweathered consolidated gypsum bedrock; abrupt smooth boundary.

Cky—48 to 60 inches (122 to 152 cm); brown (10YR 5/3) clay loam, dark yellowish brown (10YR 4/4), moist; 32 percent clay; massive; soft, very friable, very sticky and very plastic; few fine tubular pores; many fine and medium gypsum crystals; violently effervescent, 8 percent calcium carbonate equivalent and 33 percent gypsum; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: 0 to 10 percent; may contain up to 60 percent gypsum crystals and consolidated gypsum fragments

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 35 percent

Calcium carbonate equivalent: 0 to 20

Gypsum: 15 to 50 percent

Bky and Cky horizons

Hue: 10YR. 7.5YR

Value: 5 to 7 dry, 3 to 6 moist

Chroma: 2 to 4, dry or moist

Texture: sandy loam, loam, fine sandy loam, clay loam, silty clay loam, clay, silt loam, very fine sandy loam

R horizon

Consolidated calcareous and gypsiferous sedimentary bedrocks that are interbedded with nonconsolidated (lacustrine sediments) materials. Can be cemented with gypsum, calcium carbonate, and/or silica. Bedrock is hard to extremely hard and can be brittle.

With depth there is consolidated (diatomite and calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials.

Bedrock is not present in all pedons within 60 inches.

Delnorte soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids

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Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 5 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 20 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 70 percent

 cobble: 20 percent

Depth to restrictive feature(s): 6 to 20 inches to petrocalcic; 20 to 45 inches to strongly contrasting textural stratification

Drainage class: somewhat excessively drained

Ksat solum: 1.98 to 19.98 inches per hour (14.00 to 141.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.2 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limy Upland 10–13" p.z.

Ecological site number: R040XA111AZ

Present vegetation: annual grasses, catclaw acacia, creosotebush, paloverde, mormon tea, ocotillo, pricklypear and cholla, saguaro

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Mammoth; about 1,000 feet south and 1,900 feet east of the northwest corner of Section 17, Township 8 S, Range 17 E

Geographic Coordinate System:

32° 44' 30.00" north, 110° 37' 54.00" west

A—0 to 1 inch (0 to 3 cm); yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 3/4), moist; 10 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common fine irregular pores; 25 percent gravel; strongly effervescent, 1 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bk1—1 inch to 8 inches (3 to 20 cm); yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4), moist; 15 percent clay; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; common fine tubular pores; many continuous distinct carbonate coats on rock fragments; many very fine carbonate masses; 45 percent gravel; violently

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effervescent, 12 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; clear smooth boundary.

Bk2—8 to 13 inches (20 to 33 cm); pale brown (10YR 6/3) very gravelly loam, yellowish brown (10YR 5/4), moist; 15 percent clay; massive; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; few fine tubular pores; many continuous distinct carbonate coats on rock fragments; 40 percent gravel; violently effervescent, 21 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bkm—13 to 38 inches (33 to 97 cm); very hard; violently effervescent; cemented material, indurated; petrocalcic; abrupt smooth boundary.

Bk3—38 to 60 inches (97 to 152 cm); pale brown (10YR 6/3) very gravelly loamy sand, yellowish brown (10YR 5/4), moist; 3 percent clay; massive; soft, very friable, nonsticky and nonplastic; few fine irregular pores; many continuous distinct carbonate coats on rock fragments; many fine carbonate masses; 40 percent gravel; violently effervescent, 22 percent calcium carbonate equivalent and 2 percent gypsum; moderately alkaline, pH 8.0; abrupt smooth boundary.

Range in Characteristics

Rock fragments: 25 to 50 percent, averages more than 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 25 percent

A horizon

Hue: 10YR, 7.5YR

Value: 5 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loamy sand, loam

Bk horizons

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4, dry or moist

Texture: sandy loam, loam, loamy sand

Calcium carbonate equivalent: 5 to 30 percent

Gypsum: 0 to 4 percent

Bkm horizon

Cemented: calcium carbonate

Hardness: indurated

Thickness: 1 foot to 6 feet; continuous

These soils occur over consolidated (diatomite and calcareous and gypsiferous sedimentary bedrock) and nonconsolidated (lacustrine sediments) materials.

94—Stanford soils and Water, 0 to 5 percent slopes

Map Unit Setting

Landform(s): alluvial fans

Elevation: 4,200 to 4,450 feet (1,280 to 1,356 meters)

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

Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)

Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)

Frost-free period: 160 to 210 days

Major Land Resource Area: 41–Southeastern Arizona Basin and Range
Land Resource Unit: 41–1 Mexican Oak-Pine Woodland and Oak Savannah

Stream Segment Properties and Qualities

Segment length: 1.25 miles; drainage within Oak Grove Canyon in the Galiuro Mountains

Active flood plain width: 5 to 25 feet

Stream flow: perennial

Flooding hazard: very frequent; long; 7 to 30 days

Flooding month: July–September and January–March

Water table depth: 0 to 5 feet

Water table kind: apparent

Water table present: year round

Bank entrenchment –

percent cut: 90

percent uncut: 10

vertical cut: 2 to 40 feet

Depositional bar features: a dynamic system of interbraided bars and channels that relocate with each major flood event

Meander pattern: irregular meander

Channel composition:

Bedrock: 10 percent

Cobbles: 30 percent

Gravel: 35 percent

Sand: 20 percent

Silt and clay: 5 percent

Stability: a dynamic system of interbraided components that aggrade and degrade seasonally

Map Unit Composition

This is an undifferentiated map unit, and these components are not consistently associated geographically. At least one component is present in every delineation, but each delineation can have any combination of the components. This map unit is not consistent over time. Because of the active stream dynamics, the components will shift locations. The water level and water table rise and fall with the seasons, causing the soils to be wetter or dryer.

Minor components: Fluvaquents, Riverwash

Soil Properties and Qualities

Stanford soils

Taxonomic classification: Fine-loamy, mixed, superactive, thermic Cumulic Haplustolls

Geomorphic position: proximal and distal

Parent material: mixed fan alluvium

Slope: 0 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

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Physical cover
 canopy plant cover: 95 percent
 woody debris: 10 percent
 bare soil: 0 percent
rock fragments
 gravel: 20 percent
Drainage class: well drained
Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)
Available water capacity total inches: 6.8 (moderate)
Shrink-swell potential: about 4.5 LEP (moderate)
Flooding hazard: rare
Runoff class: low
Hydrologic group: B
Ecological site name: Loamy Bottom 16–20" p.z.
Ecological site number: R041XA114AZ
Present vegetation: mesquite, deergrass, Arizona sycamore, black willow, prairie
 Junegrass, oak, sideoats grama, singleleaf ash, vine mesquite
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Oak Grove Canyon; about 2,600 feet west and 1,000 feet south of the northeast corner of Section 13, Township 7 S, Range 18 E

Geographic Coordinate System:

32° 49' 43.00" north, 110° 27' 25.00" west

A—0 to 4 inches (0 to 10 cm); dark brown (7.5YR 3/3) loam, very dark brown (7.5YR 2.5/2), moist; 24 percent clay; moderate fine and medium subangular blocky parting to weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; few very fine tubular pores; very few distinct organic stains on rock fragments; 10 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

C1—4 to 20 inches (10 to 51 cm); dark brown (7.5YR 3/3) gravelly sandy clay loam, very dark brown (7.5YR 2.5/2), moist; 21 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and coarse roots; common very fine tubular pores; very few distinct organic stains on rock fragments; 20 percent gravel; noneffervescent; neutral, pH 6.8; clear smooth boundary.

C2—20 to 60 inches (51 to 152 cm); dark brown (7.5YR 3/3) sandy loam, very dark brown (7.5YR 2.5/2), moist; 19 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very coarse roots; common very fine tubular pores; 10 percent gravel; noneffervescent; neutral, pH 6.8.

Range in Characteristics

Rock fragments: 0 to 20 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 20 to 30 percent

A and C horizons

Hue: 7.5YR

Value: 2 to 4, dry or moist

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Chroma: 2 or 3, dry or moist
Texture: sandy loam, sandy clay loam, loam

Water

Width: 1 foot to 3 feet
Depth of water: 1 inch to 24 inches

95—Terrarossa-Blacktail complex, 5 to 60 percent slopes

Map Unit Setting

Landform(s): fan terraces
Elevation: 4,390 to 4,890 feet (1,338 to 1,490 meters)
Mean annual precipitation: 16 to 20 inches (406 to 508 millimeters)
Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)
Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)
Frost-free period: 150 to 200 days
Major Land Resource Area: 38—Mogollon Transition
Land Resource Unit: 38–2 Interior Chaparral—Woodlands

Map Unit Composition

Terrarossa and similar soils: 65 percent
Blacktail and similar soils: 35 percent
Minor components: Terrarossa soils that have mollic epipedons, Rock outcrop

Soil Properties and Qualities

Terrarossa soils

Taxonomic classification: Fine, mixed, superactive, thermic Aridic Paleustalfs
Geomorphic position: summits
Parent material: mixed fan alluvium
Slope: 5 to 45 percent
Surface cover:
Biological crust
 cyanobacteria: 0 percent
 lichen: 0 percent
 moss: 0 percent
Chemical crust
 salt: 0 percent
 gypsum: 0 percent
Physical cover
 canopy plant cover: 35 percent
 woody debris: 5 percent
 bare soil: 5 percent
rock fragments
 gravel: 45 percent
 cobble: 10 percent
Depth to restrictive feature(s): 1 to 10 inches to abrupt textural change
Drainage class: well drained
Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)
Available water capacity total inches: 0.4 (very low)
Shrink-swell potential: about 7.5 LEP (high)
Flooding hazard: none

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Runoff class: very high

Hydrologic group: D

Ecological site name: Loamy Slopes 16–20" p.z.

Ecological site number: R038XB208AZ

Present vegetation: curly mesquite, vine mesquite, sideoats grama, gray oak, mimosa, turbinella oak, banana yucca, singleleaf pinyon

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle El Capitan; about 2,150 feet east and 200 feet south of the northwest corner of Section 25, Township 2 S, Range 15 E

Geographic Coordinate System:

33° 14' 8.70" north, 110° 45' 59.80" west

A—0 to 2 inches (0 to 5 cm); dark brown (7.5YR 3/4) clay loam, dark brown (7.5YR 3/2), moist; 35 percent clay; moderate fine subangular blocky parting to moderate fine granular structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; many very fine irregular pores; 5 percent gravel; noneffervescent; neutral, pH 7.0; abrupt smooth boundary.

Bt1—2 to 22 inches (5 to 56 cm); reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4), moist; 60 percent clay; strong medium angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; many very fine and few fine roots; many very fine irregular and tubular pores; many continuous distinct clay films on faces of peds; noneffervescent; neutral, pH 7.0; clear smooth boundary.

Bt2—22 to 35 inches (56 to 89 cm); yellowish red (5YR 4/6) clay, dark reddish brown (5YR 3/3), moist; 45 percent clay; strong medium angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few very fine roots; many very fine irregular and tubular pores; many continuous distinct clay films on faces of peds; noneffervescent; neutral, pH 7.0; clear smooth boundary.

Bt3—35 to 60 inches (89 to 152 cm); yellowish red (5YR 5/6) clay, yellowish red (5YR 4/6), moist; 42 percent clay; strong medium angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few fine roots; many very fine irregular and tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 7.0.

Range in Characteristics

Rock fragments: 10 to 35 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 3 or 4 dry or moist

Chroma: 3 or 4, dry or 2 or 3 moist

Texture: loam, clay loam

Bt horizons

Hue: 2.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 6 dry or moist

Texture: clay

Blacktail soils

Taxonomic classification: Fine, mixed, superactive, thermic Calcic Argiustolls

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 10 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 45 percent

 cobble: 10 percent

Drainage class: well drained

Ksat solum: 0.06 to 1.98 inches per hour (0.42 to 14.00 micrometers per second)

Available water capacity total inches: 8.0 (high)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Loamy Slopes 16–20" p.z.

Ecological site number: R038XB208AZ

Present vegetation: curly mesquite, pricklypear and cholla, banana yucca, mimosa, sideoats grama

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle El Capitan; about 2,650 feet east and 550 feet south of the northwest corner of Section 25, Township 2 S, Range 15 E

Geographic Coordinate System:

33° 14' 11.00" north, 110° 46' 11.10" west

A—0 to 2 inches (0 to 5 cm); dark brown (7.5YR 3/3) clay loam, very dark brown (7.5YR 2.5/3), moist; 38 percent clay; moderate fine subangular blocky parting to moderate fine granular structure; soft, very friable, moderately sticky and very plastic; many very fine roots; many very fine irregular pores; 5 percent gravel; noneffervescent; neutral, pH 7.0; abrupt smooth boundary.

Bt—2 to 24 inches (5 to 61 cm); dark reddish brown (5YR 3/3) clay, dark reddish brown (5YR 3/3), moist; 60 percent clay; strong medium angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few very fine and common medium roots; many very fine tubular pores; many continuous distinct clay films on faces of peds; noneffervescent; neutral, pH 7.0; abrupt wavy boundary.

Bk—24 to 60 inches (61 to 152 cm); pink (7.5YR 7/3) gravelly loam, light brown (7.5YR 6/4), moist; 25 percent clay; massive; soft, friable, slightly sticky and

moderately plastic; few fine roots; many very fine and fine irregular pores; many continuous distinct carbonate coats on faces of pedes and rock fragments; 25 percent gravel and 5 percent cobble; violently effervescent, 42 percent calcium carbonate equivalent; moderately alkaline, pH 8.4.

Range in Characteristics

Rock fragments: 5 to 35 percent

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 or 3, dry or moist

Texture: loam, clay loam

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Bt horizon

Hue: 7.5YR, 5YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 2 to 4, dry or moist

Texture: clay, clay loam

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Bk horizon

Hue: 7.5YR, 10YR

Value: 5 to 7 dry or moist

Chroma: 3 or 4, dry or moist

Texture: loam, sandy loam

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Calcium carbonate equivalent: 30 to 45 percent

96—Topawa very gravelly sandy loam, 5 to 20 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,120 to 3,170 feet (645 to 965 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Map Unit Composition

Topawa and similar soils: 80 percent

Minor components: Queencreek, Riverwash, Tubac

Soil Properties and Qualities

Topawa soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Typic Paleargids

Geomorphic position: generally on summits and backslopes

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Parent material: mixed fan alluvium

Slope: 5 to 20 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 10 percent

rock fragments

 gravel: 65 percent

 cobble: 20 percent

 stone: 5 percent

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Available water capacity total inches: 2.8 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: high

Hydrologic group: B

Ecological site name: Loamy Upland 10–13" p.z.

Ecological site number: R040XA114AZ

Present vegetation: paloverde, annual forbs, saguaro, whitethorn, bush muhly, perennial forbs, mesquite, triangle bursage, fluffgrass, spidergrass, turpentine bush, brittlebush, jumping cholla, paperflower, slender janusia

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Lookout Mountain.; about 2,050 feet south and 1,300 feet east of the northwest corner of Section 6, Township 7 S, Range 17 E

Geographic Coordinate System:

32° 51' 16.70" north, 110° 39' 5.10" west

A—0 to 0.5 inch (0 to 1 cm); strong brown (7.5YR 4/6) very gravelly sandy loam, dark brown (7.5YR 3/4), moist; 11 percent clay; weak very thin platy parting to weak fine granular structure; soft, very friable, nonsticky and slightly plastic; few very fine roots; many very fine interstitial pores; 25 percent gravel and 10 percent cobble; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt1—0.5 inch to 12 inches (1 to 30 cm); dark reddish brown (2.5YR 3/4) extremely gravelly sandy clay, yellowish red (5YR 4/6), moist; 40 percent clay; strong fine and medium subangular blocky structure; hard, friable, very sticky and very plastic; many very fine and fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 45 percent gravel and 15 percent cobble; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt2—12 to 27 inches (30 to 69 cm); dark red (2.5YR 3/6) extremely gravelly sandy clay loam, yellowish red (5YR 4/6), moist; 26 percent clay; strong very fine and fine

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subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 45 percent gravel and 15 percent cobble; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Btk—27 to 48 inches (69 to 122 cm); yellowish red (5YR 4/6) extremely gravelly sandy loam, dark reddish brown (5YR 3/4), moist; 9 percent clay; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; few continuous distinct carbonate coats on rock fragments; 55 percent gravel and 10 percent cobble; strongly effervescent, 3 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk—48 to 60 inches (122 to 152 cm); strong brown (7.5YR 5/6) extremely gravelly sandy loam, strong brown (7.5YR 4/6), moist; 9 percent clay; massive; loose, nonsticky and nonplastic; common very fine interstitial pores; common continuous distinct carbonate coats on rock fragments; 50 percent gravel and 15 percent cobble; violently effervescent, 6 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 35 to 70 percent

Average percent clay in the control section: 18 to 35 percent

A horizon

Hue: 10YR, 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, or 3 or 4 moist

Texture: sandy loam

Reaction: 6.6 to 7.3 (neutral)

Bt horizon

Hue: 5YR, 2.5YR

Value: 3 or 4 dry or moist

Chroma: 3 to 6, dry or moist

Texture: sandy clay loam, clay loam, sandy clay

Reaction: 6.6 to 7.8 (neutral to slightly alkaline)

Btk and Bk horizons

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 4 to 6 dry, 3 or 4 moist

Texture: sandy loam, sandy clay loam

Calcium carbonate equivalent: 1 to 10 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Topawa as used in this mapping unit is a taxadjunct to the series because it has an abrupt textural change within one inch. Topawa series is Loamy-skeletal, mixed, superactive, thermic Typic Haplargids.

97—Tremant-Pinamt complex, 1 to 10 percent slopes

Map Unit Setting

Landform(s): fan terraces, stream terraces

Elevation: 1,570 to 2,000 feet (477 to 610 meters)

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Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40–Sonoran Basin and Range

Land Resource Unit: 40–2 Middle Sonoran Desert Shrub

Map Unit Composition

Tremant and similar soils: 50 percent

Pinamt and similar soils: 35 percent

Minor components: Mohall, Suncity, Denure

Soil Properties and Qualities

Tremant soils

Taxonomic classification: Fine-loamy, mixed, superactive, hyperthermic Typic Haplargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan and stream alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 60 percent

rock fragments

 gravel: 5 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 5.7 (moderate)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: medium

Hydrologic group: B

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: triangle bursage, creosotebush, annual grasses, jumping cholla, paloverde, saguaro, ironwood

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Superstition Mountain; about 600 feet north and 800 feet east of the southwest corner of Section 11, Township 2 S, Range 9 E

Geographic Coordinate System:

33° 16' 22.00" north, 111° 22' 33.00" west

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A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4), moist; 17 percent clay; moderate thin and medium platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few fine vesicular pores; 3 percent gravel; noneffervescent, slightly alkaline, pH 7.8; abrupt smooth boundary.

Bt—3 to 15 inches (8 to 38 cm); reddish brown (5YR 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4), moist; 23 percent clay; strong fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; few very fine and coarse roots; common fine tubular pores; many continuous prominent clay films on faces of peds and rock fragments; 17 percent gravel; noneffervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Btk1—15 to 38 inches (38 to 97 cm); reddish brown (5YR 4/4) gravelly sandy clay loam, reddish brown (5YR 4/4), moist; 23 percent clay; strong medium and coarse subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common very fine roots; common fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common very fine carbonate filaments; 25 percent gravel; slightly effervescent, 7 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Btk2—38 to 60 inches (97 to 152 cm); reddish brown (5YR 5/4) very gravelly sandy loam, reddish brown (5YR 4/4), moist; 17 percent clay; weak fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; few fine irregular pores; common continuous distinct clay films on faces of peds and rock fragments; common patchy prominent carbonate coats on rock fragments; 35 percent gravel and 10 percent cobble; violently effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 4 moist

Chroma: 4, dry or moist

Texture: sandy loam, loam

Bt horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 4 moist

Chroma: 6 to 4 dry, 4 moist

Texture: loam, sandy loam, sandy clay loam, clay loam

Rock fragments: 10 to 30 percent gravel

Calcium carbonate equivalent: 1 to 15 percent

Btk horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 4 moist

Chroma: 4, dry or moist

Texture: sandy loam, sandy clay loam

Rock fragments: 15 to 45 percent

Calcium carbonate equivalent: 5 to 20 percent

Tremant as used in this mapping unit is a taxadjunct to the series because it does not contain a calcic horizon. Tremant series is fine-loamy, mixed, superactive, thermic Typic Calcargids.

Pinamt soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, hyperthermic Typic Calciargids

Geomorphic position: generally on summits and backslopes

Parent material: mixed fan and stream alluvium

Slope: 1 to 10 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 30 percent

 woody debris: 5 percent

 bare soil: 20 percent

rock fragments

 gravel: 40 percent

 cobble: 5 percent

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Available water capacity total inches: 5.3 (moderate)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: medium

Hydrologic group: B

Ecological site name: Limy Fan 7–10" p.z.

Ecological site number: R040XB207AZ

Present vegetation: triangle bursage, creosotebush, mesquite, jumping cholla, annual grasses, paloverde, ironwood, saguaro, hedgehog cactus

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Superstition Mountain; about 1,100 feet north and 1,300 feet west of the southeast corner of Section 11, Township 2 S, Range 9 E

Geographic Coordinate System:

33° 16' 20.00" north, 111° 22' 36.00" west

A—0 to 2 inches (0 to 5 cm); strong brown (7.5YR 5/6) sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; weak thin platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; common fine irregular pores; 3 percent gravel; noneffervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bt—2 to 10 inches (5 to 25 cm); yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6), moist; 23 percent clay; moderate very fine and fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine and fine roots; few fine tubular pores; many continuous prominent clay films on faces of peds and rock fragments; 10 percent gravel; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Btk1—10 to 35 inches (25 to 89 cm); reddish brown (5YR 5/4) very gravelly sandy

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clay loam, yellowish red (5YR 4/6), moist; 22 percent clay; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; few fine tubular pores; many continuous prominent clay films on faces of peds and rock fragments; many continuous prominent carbonate coats on rock fragments; many fine carbonate filaments; 35 percent gravel and 20 percent cobble; violently effervescent, 7 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Btk2—35 to 60 inches (89 to 152 cm); reddish brown (5YR 5/4) very cobbly sandy loam, yellowish red (5YR 4/6), moist; 18 percent clay; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine tubular pores; many continuous prominent clay films on faces of peds and rock fragments; many continuous prominent carbonate coats on rock fragments; many fine carbonate filaments; 25 percent gravel and 30 percent cobble; violently effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 20 to 35 percent

A horizon

Hue: 7.5YR

Value: 5 dry, 4 moist

Chroma: 4 to 6 dry, 4 moist

Texture: sandy loam

Rock fragments: 0 to 10 percent

Bt horizon

Hue: 7.5YR, 5YR

Value: 5 dry, 4 moist

Chroma: 4 to 6, dry or moist

Texture: sandy loam, sandy clay loam

Rock fragments: 10 to 50 percent

Calcium carbonate equivalent: 5 to 15 percent

Btk horizons

Hue: 7.5YR, 5YR

Value: 5 or 6 dry, 4 moist

Chroma: 4 dry, 4 to 6 moist

Texture: sandy loam, sandy clay loam

Rock fragments: 35 to 65 percent

Calcium carbonate equivalent: 5 to 20 percent

98—Tubac-Rillino complex, 3 to 25 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 1,790 to 3,080 feet (545 to 939 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Tubac and similar soils: 55 percent

Rillino and similar soils: 35 percent

Minor components: Cave, Queencreek, Ohaco, Riverwash, Cellar, Anklam, Bucklebar, Agustin, Topawa

Soil Properties and Qualities

Tubac soils

Taxonomic classification: Fine, mixed, superactive, thermic Typic Paleargids

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 3 to 8 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 45 percent

 woody debris: 10 percent

 bare soil: 30 percent

rock fragments

 gravel: 35 percent

 cobble: 5 percent

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Available water capacity total inches: 7.9 (high)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: high

Hydrologic group: C

Ecological site name: Clay Loam Upland 10–13" p.z.

Ecological site number: R040XA120AZ

Present vegetation: turpentine bush, triangle bursage, pricklypear and cholla, annual forbs, bush muhly, paloverde

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Ninety-Six Hills NE; about 700 feet east and 700 feet south of northwest corner of Section 19, Township 5 S, Range 13 E

Geographic Coordinate System:

32° 59' 6.80" north, 111° 3' 50.10" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 4/4) sandy loam, dark brown (7.5YR 3/3), moist; 15 percent clay; moderate thick and very thick platy structure; soft, very friable,

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nonsticky and nonplastic; many very fine and few medium roots; common very fine tubular and interstitial pores; 5 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Bt—1 inch to 34 inches (3 to 86 cm); reddish brown (2.5YR 4/4) clay, reddish brown (2.5YR 4/4), moist; 50 percent clay; strong medium and coarse angular blocky structure; extremely hard, firm, very sticky and very plastic; many very fine and few medium roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common distinct pressure faces; 10 percent gravel; noneffervescent; neutral, pH 6.6; abrupt smooth boundary.

Btk—34 to 60 inches (86 to 152 cm); 20 percent pink (5YR 7/4) and 80 percent yellowish red (5YR 4/6) gravelly sandy clay loam, yellowish red (5YR 4/6), moist; 30 percent clay; strong fine and medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; common continuous distinct carbonate coats on faces of peds and rock fragments; 15 percent gravel; slightly effervescent, 6 percent calcium carbonate equivalent; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: 5 to 25 percent

Average percent clay in the control section: 35 to 60 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sandy loam, loam

Reaction: 6.6 to 7.3 (neutral)

Bt horizon

Hue: 2.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 to 6 dry or moist

Texture: clay, sandy clay, sandy clay loam

Reaction: 6.6 to 7.3 (neutral)

Btk horizon

Hue: 5YR, 7.5YR

Value: 4 to 7 dry, 4 or 5 moist

Chroma: 4 to 6 dry or moist

Texture: sandy clay loam

Calcium carbonate equivalent: 0 to 10 percent

Reaction: 7.4 to 8.4 (mildly to moderately alkaline)

Rillino soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Typic

Haplocalcids

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 3 to 25 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

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Chemical crust
salt: 0 percent
gypsum: 0 percent
Physical cover
canopy plant cover: 45 percent
woody debris: 10 percent
bare soil: 30 percent
rock fragments
gravel: 15 percent
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Available water capacity total inches: 5.4 (moderate)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: low
Hydrologic group: B
Ecological site name: Limy Slopes 10–13" p.z.
Ecological site number: R040XA110AZ
Present vegetation: creosotebush, bush muhly, paloverde, turpentine bush,
whitethorn acacia, annual forbs, catclaw acacia, fluffgrass
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Ninety-Six Hills NE; about 800 feet east and 100 feet south of the northwest corner of Section 19, Township 5 S, Range 13 E

Geographic Coordinate System:
32° 59' 24.00" north, 111° 4' 0.40" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/3) sandy loam, brown (7.5YR 4/3), moist; 8 percent clay; moderate medium and thick platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular and interstitial pores; 10 percent gravel; strongly effervescent, 3 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bk1—1 inch to 32 inches (3 to 81 cm); brown (7.5YR 5/3) gravelly sandy loam, brown (7.5YR 4/3), moist; 10 percent clay; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few medium roots; many very fine interstitial and common very fine tubular pores; common continuous distinct carbonate coats on rock fragments; 30 percent gravel; strongly effervescent, 7 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; clear smooth boundary.

Bk2—32 to 50 inches (81 to 127 cm); light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4), moist; 10 percent clay; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; many continuous distinct carbonate coats on rock fragments; 25 percent gravel; strongly effervescent, 6 percent calcium carbonate equivalent; moderately alkaline, pH 8.0; abrupt wavy boundary.

Bk3—50 to 60 inches (127 to 152 cm); pinkish gray (7.5YR 7/2) gravelly sandy loam, brown (7.5YR 5/4), moist; 8 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; many continuous distinct carbonate coats on rock fragments; 25 percent gravel; violently effervescent, 10 percent calcium carbonate equivalent; moderately alkaline, pH 8.0.

Range in Characteristics

Rock fragments: 10 to 30 percent
Reaction: 7.9 to 8.4 (moderately alkaline)
Average percent clay in the control section: 5 to 18 percent

A horizon

Hue: 10YR, 7.5YR
Value: 4 to 6 dry, 3 or 4 moist
Chroma: 3 or 4, dry or moist
Texture: sandy loam

Bk horizons

Hue: 10YR, 7.5YR
Value: 5 to 7 dry, 4 or 5 moist
Chroma: 2 to 4, dry or moist
Texture: sandy loam
Calcium carbonate equivalent: 5 to 20 percent

99—Turquoise-Coppercan complex, 5 to 45 percent slopes

Map Unit Setting

Landform(s): hills, mountains
Elevation: 4,290 to 5,980 feet (1,307 to 1,824 meters)
Mean annual precipitation: 16 to 20 inches (406 to 508 millimeters)
Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)
Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)
Frost-free period: 150 to 200 days
Major Land Resource Area: 38—Mogollon Transition
Land Resource Unit: 38–2 Interior Chaparral—Woodlands

Map Unit Composition

Turquoise and similar soils: 55 percent
Coppercan and similar soils: 25 percent
Minor components: Terrarossa, Rock outcrop, Riverwash

Soil Properties and Qualities

Turquoise soils

Taxonomic classification: Loamy, mixed, superactive, nonacid, thermic, shallow Aridic Ustorthents

Geomorphic position: generally on summits and backslopes

Parent material: alluvium and/or residuum weathered from granite

Slope: 5 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

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Physical cover
 canopy plant cover: 80 percent
 woody debris: 65 percent
 bare soil: 15 percent
rock fragments
 gravel: 35 percent
Depth to restrictive feature(s): 5 to 20 inches to bedrock, paralithic
Drainage class: well drained
Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)
Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)
Available water capacity total inches: 1.3 (very low)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: none
Runoff class: very high
Hydrologic group: C
Ecological site name: Granitic Hills 16–20" p.z.
Ecological site number: R038XB204AZ
Present vegetation: turbinella oak, banana yucca, manzanita, singleleaf pinyon, sumac, mountain mahogany, silktassel, juniper, mimosa
Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle El Capitan; about 1,400 feet west and 2,000 feet north of the southeast corner of Section 20, Township 2 S, Range 15 E

Geographic Coordinate System:

33° 14' 42.20" north, 110° 49' 41.70" west

A1—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 3/2), moist; 13 percent clay; weak medium platy parting to weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many fine irregular pores; 20 percent gravel; noneffervescent; neutral, pH 7.0; clear smooth boundary.

A2—1 inch to 14 inches (3 to 36 cm); brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 3/4), moist; 15 percent clay; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many fine irregular pores; 25 percent gravel; noneffervescent; neutral, pH 7.0; abrupt wavy boundary.

Cr—14 to 60 inches (36 to 152 cm); weathered granite bedrock.

Range in Characteristics

Rock fragments: 15 to 30 percent

Reaction: 6.6 to 7.3 (neutral)

Average percent clay in the control section: 7 to 18 percent

A horizons

Hue: 7.5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 to 4 dry or moist

Texture: sandy loam

Cr horizon

Granite bedrock.

Coppercan soils

Taxonomic classification: Clayey, mixed, superactive, thermic, shallow Aridic
Argiustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 5 to 45 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 80 percent

woody debris: 60 percent

bare soil: 15 percent

rock fragments

gravel: 25 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 0.06 to 0.57 inches per hour (0.42 to 4.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.8 (low)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Granitic Hills 16–20" p.z.

Ecological site number: R038XB204AZ

Present vegetation: turbinella oak, banana yucca, manzanita, singleleaf pinyon, sumac, mountain mahogany, silktassel, juniper, mimosa

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle El Capitan; about 1,300 feet west and 2,350 feet north of the southeast corner of Section 20, Township 2 S, Range 15 E

Geographic Coordinate System:

33° 14' 42.80" north, 110° 49' 38.80" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/3) clay loam, dark brown (7.5YR 3/3), moist; 38 percent clay; moderate medium platy parting to moderate fine subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine roots; many very fine irregular pores; 10 percent gravel; noneffervescent; neutral, pH 7.0; abrupt smooth boundary.

Bt1—2 to 9 inches (5 to 23 cm); reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/3), moist; 65 percent clay; strong fine and medium angular blocky structure;

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extremely hard, extremely firm, very sticky and very plastic; many very fine and few medium roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; neutral, pH 6.6; clear smooth boundary.

Bt2—9 to 18 inches (23 to 46 cm); reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4), moist; 65 percent clay; strong fine and medium angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few medium roots; many very fine tubular pores; many continuous distinct clay films on faces of peds and rock fragments; 5 percent gravel; noneffervescent; moderately acid, pH 6.0; abrupt wavy boundary.

Crt—18 to 60 inches (46 to 152 cm); many continuous distinct clay films along fractures; weathered granite bedrock.

Range in Characteristics

Rock fragments: 5 to 15 percent

Reaction: 5.6 to 7.3 (moderately acid to neutral)

Average percent clay in the control section: 40 to 60 percent

A horizon

Hue: 7.5YR, 5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist

Texture: clay loam

Bt horizons

Hue: 5YR

Value: 4 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sandy clay, clay

Crt horizon

Granite bedrock.

100—Turquoise-Nugget-Rock outcrop complex, 5 to 45 percent slopes

Map Unit Setting

Landform(s): hills, mountains

Elevation: 4,000 to 5,600 feet (1,219 to 1,707 meters)

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

Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)

Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)

Frost-free period: 160 to 210 days

Major Land Resource Area: 41—Southeastern Arizona Basin and Range

Land Resource Unit: 41-1 Mexican Oak-Pine Woodland and Oak Savannah

Map Unit Composition

Turquoise and similar soils: 55 percent

Nugget and similar soils: 20 percent

Rock outcrop: 20 percent

Minor components: Lanque, soils that have greater than 35 percent rock fragments, Urbanland (Oracle, AZ)

Soil Properties and Qualities

Turquoise soils

Taxonomic classification: Loamy, mixed, superactive, nonacid, thermic, shallow Aridic Ustorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 5 to 45 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 35 percent

 woody debris: 5 percent

 bare soil: 15 percent

rock fragments

 gravel: 40 percent

 cobble: 5 percent

Depth to restrictive feature(s): 8 to 20 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 1.1 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Granitic Hills 16–20" p.z.

Ecological site number: R041XA102AZ

Present vegetation: Emory oak, sideoats grama, Arizona white oak, plains lovegrass, blue oak, beggartick threeawn, cane beardgrass, green sprangletop, manzanita, sacahuista, bullgrass, Texas bluestem, hairy grama, sage, yucca, mesquite, pricklypear and cholla

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Mountain; about 1,000 feet west and 500 feet south of the northeast corner of Section 12, Township 8 S, Range 13 E

Geographic Coordinate System:

32° 45' 16.00" north, 110° 57' 7.00" west

A1—0 to 2 inches (0 to 5 cm); yellowish brown (10YR 5/4) gravelly coarse sandy loam, dark brown (10YR 3/3), moist; 15 percent clay; weak thin platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt smooth boundary.

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A2—2 to 12 inches (5 to 30 cm); yellowish brown (10YR 5/4) gravelly coarse sandy loam, dark brown (10YR 3/3), moist; 16 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine interstitial pores; 30 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

Cr—12 to 60 inches (30 to 152 cm); weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 0 to 30 percent

Organic matter: 1 to 3 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 3 to 18 percent

A horizons

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 3 or 4 dry, 2 or 3 moist

Texture: sandy loam, coarse sandy loam

Cr horizon

Granite and granodiorite bedrocks

Nugget soils

Taxonomic classification: Loamy, mixed, superactive, thermic, shallow Aridic Argiustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from granite

Slope: 5 to 45 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 50 percent

woody debris: 5 percent

bare soil: 15 percent

rock fragments

gravel: 20 percent

cobble: 5 percent

Depth to restrictive feature(s): 10 to 20 inches to bedrock, paralithic

Drainage class: well drained

Ksat solum: 0.20 to 5.95 inches per hour (1.40 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 2.1 (very low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Granitic Hills 16–20" p.z.

Ecological site number: R041XA102AZ

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

Present vegetation: Emory oak, sideoats grama, Arizona white oak, plains lovegrass, blue oak, beggartick threeawn, cane beardgrass, green sprangletop, manzanita, sacahuista, bullgrass, Texas bluestem, hairy grama, sage, mesquite, pricklypear and cholla

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Black Mountain; about 1,200 feet west and 700 feet south of the northeast corner of Section 12, Township 8 S, Range 13 E

Geographic Coordinate System:

32° 45' 17.00" north, 110° 57' 9.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/3) loam, dark brown (7.5YR 3/3), moist; 15 percent clay; weak thin and medium platy structure; slightly hard, friable, slightly sticky and moderately plastic; common very fine roots; common very fine vesicular pores; 10 percent gravel; noneffervescent; neutral, pH 6.8; abrupt smooth boundary.

Bt1—1 inch to 8 inches (3 to 20 cm); reddish brown (5YR 4/3) sandy clay loam, dark reddish brown (5YR 3/3), moist; 26 percent clay; strong fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; few medium and coarse roots; common continuous distinct clay films on faces of peds and rock fragments; 10 percent gravel; noneffervescent; slightly acid, pH 6.1; clear wavy boundary.

Bt2—8 to 15 inches (20 to 38 cm); brown (7.5YR 4/3) gravelly sandy clay loam, dark brown (7.5YR 3/3), moist; 30 percent clay; strong fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; common continuous distinct clay films on faces of peds and rock fragments; 25 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

Crt—15 to 60 inches (38 to 152 cm); common continuous distinct clay films on bedrock; weathered granite (grus) bedrock.

Range in Characteristics

Rock fragments: 0 to 25 percent

Organic matter: 1 to 3 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 18 to 35 percent

A horizon

Hue: 7.5YR

Value: 4 or 5 dry, 2 to 3 moist

Chroma: 2 or 3, dry or moist

Texture: sandy loam, loam

Bt horizons

Hue: 5YR

Value: 3 to 5 dry, 2 or 3 moist

Chroma: 2 or 3, dry or moist

Texture: sandy clay loam, clay loam

Crt horizon

Granite and granodiorite bedrocks

Rock outcrop

Rock outcrop consists of barren rock that occurs as outcroppings and boulder piles of

granite and granodiorite. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

101—Typic Fluvaquents, Wetrock soils, and Water, 0 to 3 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,750 to 2,100 feet (533 to 640 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40-1 Upper Sonoran Desert Shrub

Stream Segment Properties and Qualities

Segment length: about 28 miles of the Gila River starting from Ashurst-Hayden Dam in Florence, Arizona to the San Carlos Reservoir Dam.

Active flood plain width: 40 to 300 feet

Stream flow: perennial; minimum – 95 cubic feet per second, maximum – 5,331 cubic feet per second; average 3,278 cubic feet per second.

Data from Kelvin crossing from 1,912 to 1999

Water is released regularly from the San Carlos reservoir to provide power and irrigation water

Flooding hazard: very frequent; very long; greater than 30 days

Flooding month: July–September and January–March

Water table depth: 0 to 10 inches

Water table kind: apparent

Water table present: year round

Bank entrenchment –

percent cut: 90

percent uncut: 10

Average vertical cut: 5 to 20 feet; averages 6 to 8 feet

Depositional bar features: dynamic system of interbraided bars and channels that relocate with each major flood event; height varies with the depth and velocity of flood water

Channel composition:

percent bedrock: 2

percent cobbles: 18

percent gravel: 40

percent sand: 20

percent silt and clay: 20

Stability: a dynamic system of interbraided components that are generally degrading

Map Unit Composition

This is an undifferentiated map unit. These components are not consistently associated geographically. At least one component is present in every delineation, but each delineation can have any combination of the components. This map unit is not consistent over time. Because of the active stream dynamics of the Gila River, its

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components shift locations. The water level and water table rise and fall with the seasons, causing the soils to be wetter or dryer.

Minor components: Quiburi, Cascabel, Hantz, Glendale, Gila, sandy Typic Fluvaquents, Fluvaquents that have thick silty clay or silty clay loam surface textures

Soil Properties and Qualities

Typic Fluvaquents soils

Taxonomic classification: Typic Fluvaquents

Geomorphic position: drainageways immediately adjacent to water component

Parent material: mixed stream alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 10 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 50 percent

 woody debris: 5 percent

 bare soil: 5 percent

rock fragments

 gravel: 80 percent

Drainage class: poorly drained

Ksat solum: 0.20 to 39.69 inches per hour (1.40 to 280.00 micrometers per second)

Available water capacity total inches: 2.9 (low)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: very frequent

Seasonal water table minimum depth: about 0 to 20 inches

Runoff class: medium

Hydrologic group: D

Ecological site name: Populus fremontii-Salix gooddingii/Sporobolus wrightii

Ecological site number: F040XA125AZ

Present vegetation: tamarisk, willow, cottonwood, mesquite

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; about 700 feet south and 300 feet west of the northeast corner of Section 33, Township 4 S, Range 14 E

Geographic Coordinate System:

33° 2' 40.00" north, 110° 54' 50.00" west

C—0 to 2 inches (0 to 5 cm); brown (7.5YR 5/3) very gravelly coarse sand, brown (7.5YR 4/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; common fine roots; many fine irregular pores; 45 percent gravel and 5 percent cobble; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Cg1—2 to 5 inches (5 to 13 cm); 10 percent greenish black (5GY 2.5/1) and 90 percent dark brown (7.5YR 3/3) silty clay loam, 10 percent greenish black (5GY 2.5/1) and 90 percent dark brown (7.5YR 3/3), moist; 34 percent clay; moderate very fine and fine subangular blocky and weak very fine platy structure; soft, very

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friable, very sticky and very plastic; many very fine and fine roots; many fine interstitial pores; many distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine soft iron masses and lining along root channels; 5 percent gravel; violently effervescent; slightly alkaline, pH 7.8; abrupt smooth boundary.

Cg2—5 to 12 inches (13 to 30 cm); dark brown (7.5YR 3/2) fine sandy loam, dark brown (7.5YR 3/2), moist; 8 percent clay; massive; soft, very friable, moderately sticky and moderately plastic; many very fine and fine roots; many fine irregular pores; many distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine soft iron masses and lining along root channels; 5 percent gravel; violently effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

Cg3—12 to 60 inches (30 to 152 cm); brown (7.5YR 4/3) water, very gravelly coarse sand, brown (7.5YR 4/3), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; 45 percent gravel; violently effervescent; slightly alkaline, pH 7.6.

Range in Characteristics

Rock fragments: 0 to 20 percent, contains greater than 35 percent in lower substratum

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 5 to 40 percent

Calcium carbonate equivalent: 1 to 5 percent

C horizons

Hue: 7.5YR, 10YR, 5BG

Value: 3 to 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 1 to 3 moist

Texture: coarse sand, fine sand, silty clay loam, silt loam, fine sandy loam

Cg horizons

Hue: 7.5YR, 10YR, 5B, 5GY, 10BG

Value: 2 to 5 moist

Chroma: 1 to 3 moist

Texture: coarse sand, sand with thin strata of sandy loam, fine sandy loam, silt loam, silty clay loam

Wetrock soils

Taxonomic classification: Sandy-skeletal, mixed, thermic Oxyaquic Torrifuvents

Geomorphic position: drainageways usually farthest from the water component, or can be sandbars

Parent material: mixed stream alluvium

Slope: 0 to 3 percent

Surface cover:

Biological crust

cyanobacteria: 0 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 0 percent

Physical cover

canopy plant cover: 40 percent

woody debris: 5 percent

bare soil: 5 percent

rock fragments

gravel: 60 percent

cobble: 20 percent

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Drainage class: moderately well drained

Ksat solum: 19.98 to 39.69 inches per hour (141.00 to 280.00 micrometers per second)

Available water capacity total inches: 1.5 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: frequent

Seasonal water table minimum depth: about 20 to 40 inches

Runoff class: negligible

Hydrologic group: C

Ecological site name: Populus fremontii-Salix gooddingii/Sporobolus wrightii

Ecological site number: F040XA125AZ

Present vegetation: tamarisk, willow, cottonwood, mesquite

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Kearny; about 900 feet south and 200 feet west of the northeast corner of Section 33, Township 4 S, Range 14 E

Geographic Coordinate System:

33° 2' 42.00" north, 110° 54' 51.00" west

C1—0 to 10 inches (0 to 25 cm); brown (7.5YR 5/3) extremely gravelly coarse sand, dark brown (7.5YR 3/3), moist; 3 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many fine interstitial pores; 75 percent gravel and 10 percent cobble; strongly effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

C2—10 to 20 inches (25 to 51 cm); brown (7.5YR 5/2) gravelly coarse sand, dark brown (7.5YR 3/4), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; many very fine and fine roots and common medium roots; many fine interstitial pores; thin strata silt loam; common distinct brown (7.5YR 5/2) and dark greenish gray (5BG 3/1) redoximorphic depletions; many distinct strong brown (7.5YR 5/8) redoximorphic concentrations as fine soft iron masses and linings along root channels; 20 percent gravel and 5 percent cobble; strongly effervescent; slightly alkaline, pH 7.6; abrupt smooth boundary.

C3—20 to 37 inches (51 to 94 cm); brown (7.5YR 5/2) extremely gravelly coarse sand, brown (7.5YR 4/4), moist; 2 percent clay; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; many fine interstitial pores; few distinct strong brown (7.5YR 5/8) redoximorphic concentrations as linings along root channels; 65 percent gravel and 15 percent cobble; strongly effervescent; slightly alkaline, pH 7.8; clear smooth boundary.

C4—37 to 60 inches (94 to 152 cm); brown (7.5YR 4/2) extremely cobbly coarse sand saturated with water, dark brown (7.5YR 3/2), moist; 1 percent clay; single grain; loose, nonsticky and nonplastic; 30 percent gravel and 40 percent cobble; neutral, pH 7.2.

Range in Characteristics

Rock fragments: 35 to 80 percent

Reaction: 6.6 to 8.4 (neutral to moderately alkaline)

Average percent clay in the control section: 1 to 5 percent

Calcium carbonate equivalent: 1 to 3 percent

C1 horizon

Hue: 7.5YR, 10YR

Value: 5 or 6 dry, 3 or 4 moist

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Chroma: 3 or 4, dry or moist

Texture: coarse sand, fine sand, silt loam, very fine sandy loam

C2–C4 horizons

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 3 to 5 moist

Chroma: 2 to 4, dry or moist

Texture: coarse sand, sand, with thin strata of silt loam, silty clay loam

Redoximorphic features: common to many redoximorphic concentrations occurring as masses and linings along root channels (7.5YR 5/8, 7.5YR 6/2) and few to common redoximorphic depletions (5BG 3/1, 10BG 3/1, 5B 3/1 10B 3/1); usually occurs in strata finer than loamy fine sand

Water

Width: 20 to 300 feet

Depth of water: 2 to 10 feet

102—Ugyp-Whitecliff complex, eroded, 1 to 5 percent slopes

Map Unit Setting

Landform(s): alluvial fans

Elevation: 1,750 to 3,800 feet (532 to 1,158 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

Frost-free period: 220 to 280 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Ugyp and similar soils: 55 percent

Whitecliff and similar soils: 35 percent

Minor components: Gila, Stagecoach, Glendale, Agustin, Riverwash, Queencreek, soils that have very gravelly loam and silt loam textures, soils that have pH 8.6 to 10

This map unit is designated as eroded because of the high hazard of erosion by piping, gully erosion, and sheet flow. Concentration of water flow will cause severe erosion (gyp crevasses).

Soil Properties and Qualities

Ugyp soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Typic Calcigypsis

Geomorphic position: proximal and distal

Parent material: gypsiferous and calcareous lacustrine deposits

Slope: 1 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 30 percent

lichen: 0 percent

moss: 0 percent

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Chemical crust
salt: 0 percent
gypsum: 20 percent
Physical cover
canopy plant cover: 20 percent
woody debris: 5 percent
bare soil: 25 percent
rock fragments: 0 percent
Drainage class: well drained
Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)
Available water capacity total inches: 8.8 (high)
Shrink-swell potential: about 1.5 LEP (low)
Flooding hazard: rare
Runoff class: very low
Hydrologic group: B
Ecological site name: Gypsum Upland 10–13" p.z.
Ecological site number: R040XA126AZ
Present vegetation: creosotebush, mesquite, Christmas cactus, filareestaghorn cholla
Land capability (irrigated): 2e
Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Dudleyville; about 500 feet south and 700 feet west of the northeast corner of Section 21, Township 6 S, Range 16 E
Geographic Coordinate System:
32° 54' 9.00" north, 110° 42' 33.00" west

A—0 to 4 inches (0 to 10 cm); pale brown (10YR 6/3) loam, brown (10YR 4/3), moist; 22 percent clay; weak thin platy parting to weak very fine and fine, and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common fine tubular and vesicular pores; many very fine gypsum masses; 5 percent gravel; violently effervescent, 5 percent calcium carbonate equivalent and 23 percent gypsum; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bky1—4 to 28 inches (10 to 71 cm); brown (10YR 5/3) stratified fine sand to fine sandy loam, brown (10YR 4/3), moist; 10 percent clay; weak fine and medium subangular blocky structure parting to massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine tubular pores; common very fine gypsum masses; few medium gypsum crystals; 5 percent gravel; violently effervescent, 5 percent calcium carbonate equivalent and 45 percent gypsum; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bky2—28 to 42 inches (71 to 107 cm); light brown (7.5YR 6/3) silt loam, brown (7.5YR 4/3), moist; 23 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and moderately plastic; few very fine and fine roots; common fine tubular pores; many very fine and fine gypsum masses; violently effervescent, 5 percent calcium carbonate equivalent and 36 percent gypsum; slightly alkaline, pH 7.8; abrupt smooth boundary.

Bky3—42 to 60 inches (107 to 152 cm); light brown (7.5YR 6/3) silt loam, brown (7.5YR 4/3), moist; 25 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and very plastic; few very fine roots; few fine tubular pores; many very fine gypsum masses; violently effervescent, 6

percent calcium carbonate equivalent and 22 percent gypsum; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: less than 15 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 3 to 18 percent

A horizons

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 3 to 5 moist

Chroma: 2 to 4 dry, 3 or 4 moist

Texture: silt loam, loam, fine sandy loam

Calcium carbonate equivalent: 1 to 15 percent

Gypsum: 0 to 25 percent

Bky horizons

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 3 or 4, dry or moist

Texture: very fine sandy loam, silt loam, loam, sandy loam, fine sandy loam can have finer or coarser textured stratifications

Calcium carbonate equivalent: 5 to 20 percent

Gypsum: 5 to 50 percent

Whitecliff soils

Taxonomic classification: Fine-silty, mixed, superactive, thermic Leptic Haplogypsiids

Geomorphic position: proximal and distal

Parent material: gypsiferous and calcareous lacustrine deposits

Slope: 1 to 5 percent

Surface cover:

Biological crust

cyanobacteria: 30 percent

lichen: 0 percent

moss: 0 percent

Chemical crust

salt: 0 percent

gypsum: 20 percent

Physical cover

canopy plant cover: 20 percent

woody debris: 5 percent

bare soil: 25 percent

rock fragments: 0 percent

Drainage class: well drained

Ksat solum: 0.57 to 5.95 inches per hour (4.00 to 42.00 micrometers per second)

Available water capacity total inches: 10.7 (very high)

Shrink-swell potential: about 4.5 LEP (moderate)

Flooding hazard: rare

Runoff class: low

Hydrologic group: B

Ecological site name: Gypsum Upland 10–13" p.z.

Ecological site number: R040XA126AZ

Present vegetation: creosotebush, mesquite, Christmas cactus, filareestaghorn cholla

Land capability (irrigated): 2e

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Dudleyville; about 400 feet south and 1,600 feet west of the northeast corner of Section 21, Township 6 S, Range 16 E

Geographic Coordinate System:

32° 54' 10.00" north, 110° 42' 47.00" west

A—0 to 3 inches (0 to 8 cm); brown (7.5YR 5/3) loam, brown (7.5YR 4/3), moist; 17 percent clay; weak thin platy parting to moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine tubular and vesicular pores; violently effervescent, 7 percent calcium carbonate equivalent and 10 percent gypsum; moderately alkaline, pH 8.0; abrupt smooth boundary.

Bky1—3 to 35 inches (8 to 89 cm); light brown (7.5YR 6/3) silt loam, brown (7.5YR 4/3), moist; 25 percent clay; moderate fine and medium subangular blocky structure; slightly hard, friable, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; few patchy distinct organic stains on faces of peds; many very fine and fine gypsum masses; violently effervescent, 9 percent calcium carbonate equivalent and 31 percent gypsum; moderately alkaline, pH 8.0; clear smooth boundary.

Bky2—35 to 60 inches (89 to 152 cm); light brown (7.5YR 6/3) silt loam, brown (7.5YR 4/3), moist; 22 percent clay; moderate medium and coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; many very fine and fine gypsum masses; violently effervescent, 8 percent calcium carbonate equivalent and 30 percent gypsum; slightly alkaline, pH 7.8.

Range in Characteristics

Rock fragments: less than 15 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 18 to 30 percent

Calcium carbonate equivalent: 5 to 15 percent

Gypsum: 5 to 40 percent

A horizon

Hue: 10YR, 7.5YR

Value: 3 to 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: silt loam, loam, silty clay loam, fine sandy loam

Bky horizons

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 3 to 6 moist

Chroma: 3 or 4, dry or moist

Texture: silty clay loam, silt loam, clay loam, loam, can have finer or coarser textured stratifications

103—Vint loamy fine sand, 0 to 2 percent slopes

Map Unit Setting

Landform(s): flood plains

Elevation: 1,500 to 1,600 feet (457 to 488 meters)

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Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Mean annual air temperature: 70 to 72 degrees F (21.1 to 22.2 degrees C)

Mean annual soil temperature: 72 to 74 degrees F (22.2 to 23.3 degrees C)

Frost-free period: 240 to 325 days

Major Land Resource Area: 40—Sonoran Basin and Range

Land Resource Unit: 40—2 Middle Sonoran Desert Shrub

Map Unit Composition

Vint and similar soils: 90 percent

Minor components: Carrizo, Central Arizona Project Canal, Vint that have very gravelly sandy loam textures below 40 inches

Soil Properties and Qualities

Vint soils

Taxonomic classification: Sandy, mixed, hyperthermic Typic Torrifuvents

Geomorphic position: drainageways

Parent material: mixed stream alluvium

Slope: 0 to 2 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 0 percent

 woody debris: 5 percent

 bare soil: 100 percent (fallow farm field)

rock fragments: 0 percent

Drainage class: somewhat excessively drained

Ksat solum: 5.95 to 19.98 inches per hour (42.00 to 141.00 micrometers per second)

Available water capacity total inches: 5.8 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: occasional

Runoff class: very low

Hydrologic group: A

Ecological site name: Sandy Wash 7–10" p.z.

Ecological site number: R040XB216AZ

Present vegetation: big sagebrush, bush muhly, creosotebush, ironwood, paloverde, mesquite, slim tridens, threeawn

Land capability (irrigated): 3w

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Florence SE; about 2,400 feet south and 1,300 feet east of the northwest corner of Section 12, Township 4 S, Range 10 E

Geographic Coordinate System:

33° 5' 43.44" north, 111° 16' 36.86" west

Ap1—0 to 4 inches (0 to 10 cm); brown (7.5YR 5/3) loamy fine sand, brown (7.5YR

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4/3), moist; 5 percent clay; weak medium, thick and very thick platy structure; soft, very friable, nonsticky and nonplastic; many fine roots; few fine irregular pores; strongly effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

Ap2—4 to 12 inches (10 to 30 cm); brown (7.5YR 5/3) loamy fine sand, brown (7.5YR 4/3), moist; 5 percent clay; weak coarse cloddy structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; few fine tubular pores; strongly effervescent; moderately alkaline, pH 8.0; clear smooth boundary.

C1—12 to 33 inches (30 to 84 cm); brown (7.5YR 5/3) loamy fine sand, brown (7.5YR 4/3), moist; 5 percent clay; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine irregular pores; strongly effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary.

C2—33 to 54 inches (84 to 137 cm); brown (7.5YR 5/3) loamy fine sand, dark brown (7.5YR 3/3), moist; 5 percent clay; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many fine irregular and tubular pores; few fine carbonate filaments; strongly effervescent; moderately alkaline, pH 8.0; abrupt smooth boundary.

C3—54 to 66 inches (137 to 168 cm); brown (7.5YR 5/3) fine sand, brown (7.5YR 4/3), moist; 2 percent clay; massive; soft, very friable, nonsticky and nonplastic; many fine irregular pores; strongly effervescent; moderately alkaline, pH 8.0.

Range in Characteristics

Reaction: 7.9 to 8.4 (moderately alkaline)

Average percent clay in the control section: 3 to 10 percent

Calcium carbonate equivalent: 0 to 2 percent

A horizons

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 3 or 4, dry or moist

Texture: loamy fine sand, sand

C horizons

Hue: 10YR, 7.5YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 2 to 4, dry or moist

Texture: loamy fine sand, fine sand with thin strata of finer or coarser textured soil material

104—White House-Stronghold complex, 5 to 60 percent slopes

Map Unit Setting

Landform(s): fan terraces

Elevation: 2,990 to 4,590 feet (912 to 1,398 meters)

Mean annual precipitation: 12 to 16 inches (305 to 406 millimeters)

Mean annual air temperature: 57 to 65 degrees F (13.9 to 18.3 degrees C)

Mean annual soil temperature: 59 to 67 degrees F (15.0 to 19.4 degrees C)

Frost-free period: 170 to 220 days

Major Land Resource Area: 38—Mogollon Transition

Land Resource Unit: 38—1 Arizona Interior Chaparral

Map Unit Composition

White house and similar soils: 70 percent

Stronghold and similar soils: 20 percent

Minor components: Tombstone, Riverwash, soils that are very deep and clayey skeletal

Soil Properties and Qualities

White House soils

Taxonomic classification: Fine, mixed, superactive, thermic Ustic Haplargids

Geomorphic position: summits

Parent material: mixed fan alluvium

Slope: 5 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 5 percent

 bare soil: 35 percent

rock fragments

 gravel: 35 percent

 cobble: 30 percent

Drainage class: well drained

Ksat solum: 0.06 to 5.95 inches per hour (0.42 to 42.00 micrometers per second)

Available water capacity total inches: 6.8 (moderate)

Shrink-swell potential: about 7.5 LEP (high)

Flooding hazard: none

Runoff class: very high

Hydrologic group: C

Ecological site name: Clayey Slopes 12–16" p.z.

Ecological site number: R038XA108AZ

Present vegetation: curly mesquite, pricklypear and cholla, annual forbs, sideoats

 grama, juniper, mesquite, perennial forbs, false mesquite, purple threeawn,

 catclaw acacia

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hot Tamale Peak; about 1,458 feet west and 1,625 feet south of the northeast corner of Section 34, Township 2 S, Range 14 E

Geographic Coordinate System:

33° 13' 1.20" north, 110° 54' 0.10" west

A—0 to 2 inches (0 to 5 cm); brown (7.5YR 4/3) gravelly sandy loam, dark brown (7.5YR 3/3), moist; 15 percent clay; moderate thick platy parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots;

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many very fine interstitial pores; 20 percent gravel; noneffervescent; slightly acid, pH 6.2; clear smooth boundary.

Bt1—2 to 5 inches (5 to 13 cm); reddish brown (5YR 4/3) gravelly sandy clay loam, dark reddish brown (5YR 3/3), moist; 28 percent clay; moderate fine and medium subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; many very fine and fine roots; many very fine interstitial and tubular pores; common continuous distinct clay films on faces of ped and rock fragments; 20 percent gravel; noneffervescent; slightly acid, pH 6.2; abrupt smooth boundary.

Bt2—5 to 14 inches (13 to 36 cm); reddish brown (2.5YR 4/4) very gravelly clay, dark reddish brown (2.5YR 3/4), moist; 50 percent clay; strong fine and medium subangular blocky structure; very hard, friable, very sticky and very plastic; many very fine and fine roots; many very fine tubular pores; many continuous distinct clay films on faces of ped and rock fragments; 35 percent gravel and 5 percent cobble; noneffervescent; slightly acid, pH 6.4; abrupt wavy boundary.

Bt3—14 to 27 inches (36 to 69 cm); reddish brown (2.5YR 5/4) gravelly clay, reddish brown (2.5YR 4/4), moist; 50 percent clay; strong fine and medium subangular blocky structure; very hard, friable, very sticky and very plastic; many very fine roots; many very fine tubular pores; many continuous distinct clay films on faces of ped and rock fragments; 25 percent gravel; noneffervescent; slightly acid, pH 6.4; abrupt smooth boundary.

Btk—27 to 41 inches (69 to 104 cm); reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4), moist; 50 percent clay; massive; slightly hard, friable, very sticky and very plastic; common very fine and fine roots; many very fine interstitial pores; few continuous distinct clay films and on faces of ped and rock fragments; few continuous distinct carbonate coats on rock fragments; 5 percent gravel; noneffervescent, 5 percent calcium carbonate equivalent; slightly acid, pH 6.4; clear smooth boundary.

Bk—41 to 60 inches (104 to 152 cm); light brown (7.5YR 6/4) sandy loam, brown (7.5YR 4/4), moist; 13 percent clay; massive; hard, friable, nonsticky and nonplastic; common fine roots; many very fine interstitial pores; few continuous distinct carbonate coats on rock fragments; 5 percent gravel; very slightly effervescent, 4 percent calcium carbonate equivalent; slightly acid, pH 6.4.

Range in Characteristics

Rock fragments: 5 to 40 percent, averages less than 35 percent

Reaction: 6.1 to 7.3 (slightly acid to neutral)

Average percent clay in the control section: 35 to 55 percent

A horizon

Hue: 5YR, 7.5YR

Value: 3 or 4, dry or moist

Chroma: 2 or 3, dry or moist

Texture: sandy clay loam, sandy loam, loam

Bt horizons

Hue: 2.5YR, 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry, 3 to 6 moist

Texture: sandy clay, clay, clay loam

Btk and Bk horizons

Hue: 5YR, 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

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Chroma: 3 or 4, dry or moist
Texture: sandy clay loam, sandy loam, clay
Calcium carbonate equivalent: 0 to 5 percent

Stronghold soils

Taxonomic classification: Coarse-loamy, mixed, superactive, thermic Ustic
Haplocalcids

Geomorphic position: backslopes

Parent material: mixed fan alluvium

Slope: 5 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 45 percent

 woody debris: 5 percent

 bare soil: 40 percent

rock fragments

 gravel: 25 percent

 cobble: 3 percent

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Available water capacity total inches: 6.9 (moderate)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: medium

Hydrologic group: B

Ecological site name: Limy Slopes 12–16" p.z.

Ecological site number: R038XA126AZ

Present vegetation: blue threeawn, filaree, slim tridens, catclaw acacia, black grama, bush muhly, ocotillo, pricklypear and cholla, whitethorn acacia, jojoba, perennial forbs, agave, banana yucca, false mesquite, fluffgrass, sideoats grama, snakeweed

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Hot Tamale Peak; about 1,250 feet east and 1,000 feet south of the northwest corner of Section 3, Township 3 S, Range 14 E

Geographic Coordinate System:

33° 12' 14.90" north, 110° 54' 31.00" west

A—0 to 4 inches (0 to 10 cm); brown (10YR 5/3) loam, dark grayish brown (10YR 4/2), moist; 13 percent clay; weak medium platy parting to weak fine granular structure; soft, very friable, moderately sticky and moderately plastic; many very fine and fine roots; many very fine interstitial pores; 10 percent gravel; violently effervescent, 1 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; clear smooth boundary.

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Bk1—4 to 13 inches (10 to 33 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 13 percent clay; weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; common very fine interstitial pores; common continuous distinct carbonate coats on rock fragments; 10 percent gravel; violently effervescent, 1 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Bk2—13 to 27 inches (33 to 69 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 11 percent clay; massive; hard, firm, nonsticky and nonplastic; common very fine roots; common very fine and fine tubular and interstitial pores; many continuous distinct carbonate coats on faces of peds and rock fragments; 5 percent gravel; violently effervescent, 7 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Bk3—27 to 41 inches (69 to 104 cm); brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/3), moist; 13 percent clay; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular and interstitial pores; many continuous distinct carbonate coats on faces of peds and rock fragments; 20 percent gravel; violently effervescent, 7 percent calcium carbonate equivalent; slightly alkaline, pH 7.8; abrupt wavy boundary.

Bk4—41 to 60 inches (104 to 152 cm); brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/3), moist; 11 percent clay; massive; soft, friable, nonsticky and nonplastic; common very fine roots; many very fine and fine interstitial pores; common continuous distinct carbonate coats on faces of peds and rock fragments; 10 percent gravel; violently effervescent, 7 percent calcium carbonate equivalent; slightly alkaline, pH 7.6.

Range in Characteristics

Rock fragments: 5 to 35 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 8 to 18 percent

A horizon

Hue: 7.5YR, 10YR

Value: 4 or 5 dry or moist

Chroma: 2 or 3 dry or moist

Texture: loam

Bk horizons

Hue: 7.5YR, 10YR

Value: 4 or 5 dry or moist

Chroma: 3 or 4 dry or moist

Texture: sandy loam, loam

Calcium carbonate equivalent: 5 to 20 percent

105—Wikieup family, very channery sandy loam, 10 to 60 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 2,190 to 3,290 feet (669 to 1,003 meters)

Mean annual precipitation: 10 to 12 inches (254 to 305 millimeters)

Mean annual air temperature: 64 to 70 degrees F (17.8 to 21.1 degrees C)

Mean annual soil temperature: 66 to 72 degrees F (18.9 to 22.2 degrees C)

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Frost-free period: 220 to 280 days

Major Land Resource Area: 40–Sonoran Basin and Range

Land Resource Unit: 40–1 Upper Sonoran Desert Shrub

Map Unit Composition

Wikieup family and similar soils: 80 percent

Minor components: Anklam, Queencreek, Rock outcrop, Riverwash

Soil Properties and Qualities

Wikieup family soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, nonacid, thermic, shallow Typic Torriorthents

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from schist

Slope: 10 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 40 percent

 woody debris: 10 percent

 bare soil: 15 percent

rock fragments

 channer: 85 percent

 flagstone: 10 percent

 stone: 1 percent

Depth to restrictive feature(s): 5 to 15 inches to bedrock, paralithic; 10 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.6 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Schist Hills 10–13" p.z.

Ecological site number: R040XA119AZ

Present vegetation: annual forbs, triangle bursage, annual grasses, saguaro, perennial forbs, blue threeawn, brittlebush, paloverde, ocotillo, jojoba

Land capability (non irrigated): 7c

Typical Profile

Location

Public Land Survey: USGS Quadrangle Mineral Mountain; about 3,350 feet east and 275 feet south of the northwest corner of Section 4, Township 3 S, Range 11 E

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Geographic Coordinate System:

33° 12' 18.80" north, 111° 13' 21.00" west

A—0 to 1 inch (0 to 3 cm); brown (7.5YR 5/4) very channery sandy loam, brown (7.5YR 4/3), moist; 7 percent clay; weak fine granular structure; soft, loose, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 35 percent channers and 5 percent flagstones; noneffervescent; slightly acid, pH 6.2; clear smooth boundary.

C—1 inch to 8 inches (3 to 20 cm); brown (7.5YR 5/4) very channery sandy loam, brown (7.5YR 4/4), moist; 15 percent clay; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots and few medium roots; many very fine tubular pores; 35 percent channers and 2 percent flagstones; noneffervescent; moderately acid, pH 6.0; abrupt wavy boundary.

Cr—8 to 15 inches (20 to 38 cm); weathered schist bedrock.

R—15 to 60 inches (38 to 152 cm); unweathered schist bedrock.

Range in Characteristics

Rock fragments: 35 to 65 percent

Reaction: 5.6 to 7.3 (moderately acid to neutral)

Average percent clay in the control section: 7 to 18 percent

A and C horizons

Hue: 7.5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 3 or 4 dry or moist

Texture: sandy loam, loam

Cr and R horizons

Schist bedrock

Wikieup as used in this mapping unit is at the family level. The Wikieup series is moist in the soil moisture control section for fewer than 20 days cumulative between July and August.

106—Yarbam-Rock outcrop complex, 20 to 60 percent slopes

Map Unit Setting

Landform(s): mountains

Elevation: 4,170 to 5,760 feet (1,272 to 1,757 meters)

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

Mean annual air temperature: 57 to 62 degrees F (13.9 to 16.7 degrees C)

Mean annual soil temperature: 59 to 64 degrees F (15.0 to 17.8 degrees C)

Frost-free period: 150 to 200 days

Major Land Resource Area: 38—Mogollon Transition

Land Resource Unit: 38-2 Upper Interior Chaparral

Map Unit Composition

Yarbam and similar soils: 80 percent

Rock outcrop: 10 percent

Minor components: Woodcutter and soils that contain more than 30 percent clay

Soil Properties and Qualities

Yarbam soils

Taxonomic classification: Loamy-skeletal, mixed, superactive, thermic Aridic Lithic Haplustolls

Geomorphic position: generally on summits and backslopes

Parent material: slope alluvium and/or residuum weathered from limestone

Slope: 20 to 60 percent

Surface cover:

Biological crust

 cyanobacteria: 0 percent

 lichen: 0 percent

 moss: 0 percent

Chemical crust

 salt: 0 percent

 gypsum: 0 percent

Physical cover

 canopy plant cover: 55 percent

 woody debris: 25 percent

 bare soil: 5 percent

rock fragments

 gravel: 65 percent

 cobble: 25 percent

 stone: 5 percent

Depth to restrictive feature(s): 6 to 20 inches to bedrock, lithic

Drainage class: well drained

Ksat solum: 1.98 to 5.95 inches per hour (14.00 to 42.00 micrometers per second)

Ksat restrictive layer: 0.00 to 0.06 inches per hour (0.00 to 0.42 micrometers per second)

Available water capacity total inches: 0.9 (very low)

Shrink-swell potential: about 1.5 LEP (low)

Flooding hazard: none

Runoff class: very high

Hydrologic group: D

Ecological site name: Limestone Hills 16–20" p.z.

Ecological site number: R038XB205AZ

Present vegetation: pricklypear and cholla, sideoats grama, agave, banana yucca, false mesquite, mountain mahogany, red brome, snakeweed, sotol, turbinella oak, juniper

Land capability (non irrigated): 6c

Typical Profile

Location

Public Land Survey: USGS Quadrangle El Capitan; about 2,450 feet east and 2,400 feet south of the northwest corner of Section 31, Township 2 S, Range 15 E

Geographic Coordinate System:

33° 13' 8.00" north, 110° 51' 13.80" west

A—0 to 1 inch (0 to 3 cm); brown (10YR 4/3) extremely gravelly loam, very dark grayish brown (10YR 3/2), moist; 14 percent clay; moderate thin platy parting to weak very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular pores; 55 percent gravel and 5 percent cobble; strongly effervescent, 9 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt smooth boundary.

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Bk—1 inch to 11 inches (3 to 28 cm); brown (10YR 4/3) very cobbly loam, very dark grayish brown (10YR 3/2), moist; 14 percent clay; moderate very fine and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and medium roots; many very fine irregular pores; many continuous distinct carbonate coats on rock fragments; 20 percent gravel and 30 percent cobble; slightly effervescent, 8 percent calcium carbonate equivalent; moderately alkaline, pH 8.2; abrupt wavy boundary.

R—11 to 60 inches (28 to 152 cm); unweathered limestone bedrock.

Range in Characteristics

Rock fragments: 35 to 70 percent

Organic matter: 1 to 2 percent

Reaction: 7.4 to 8.4 (slightly to moderately alkaline)

Average percent clay in the control section: 7 to 18 percent

A horizon

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist

Texture: loam, sandy loam

Bk horizon

Hue: 7.5YR, 10YR

Value: 4 or 5 dry, or 2 or 3 moist

Chroma: 2 to 3 dry or moist

Texture: loam, sandy loam

Calcium carbonate equivalent: 0 to 10 percent

R horizon

Limestone bedrock

Rock outcrop

Rock outcrop consists of barren rock that occurs as ledges and nearly vertical cliffs of limestone and other related sedimentary rocks. Rock outcrop also includes areas where the depth to bedrock is less than four inches. The higher percentage of rock outcrop is in areas near the mountaintops.

Formation of the Soils

Soil is the natural medium for the growth of plants. Both physical and biological forces influence its formation. Most soils formed in material weathered from rocks. Changes made by plants are even more important than this parent material, for plants give those characteristics to a soil or landscape that are most important to humans. Essentially, all life depends upon the soil. There can be no life without soil and no soil without life. They have evolved together.

All features of the natural landscape, conceived of as the total environment for living organisms, are interdependent. There is a relationship between climate and vegetation, between parent rock and vegetation, between age and slope, and even between climate and slope. All express themselves in the soil, which is the final synthetic expression of the forces in the natural landscape working together. The nature of the landscape can be characterized better, more completely, and more directly by soil than by any other factor or combination of factors.

Soil is the result of the combined and integrated effects of climate and the living organisms acting upon the parent material, which in turn is influenced by topography and local relief over time. Soils are dynamic, natural bodies on the earth's surface that are capable of supporting plants. They are composed of mineral and organic material, including dilute solutions, gaseous mixtures, and micro-organisms.

Tremendous diversity occurs in soils as a result of unique combinations of soil-forming factors. Differences in soil morphology, expressed in a vertical cross section through soil horizons, result from the combined interaction of climate, living organisms, parent material, topography, and time. Soil horizons are continually evolving in response to these factors.

Climate

Climate, past and present, has a strong effect on soil formation. Temperature and moisture affect the weathering of parent material, the release and leaching and/or accumulation of nutrients, and the activity of micro-organisms. They also influence the native plant community growing on the soil, which in turn influences soil formation. Wind and water transport soil material over long distances, and solar radiation affects soil moisture retention and oxidation of surface organic matter. In general, the intensity of weathering processes increases as both temperature and moisture rise.

Living Organisms

The living organisms that influence soil formation include micro-organisms, plants, and animals. Within the soil, the life processes of bacteria, algae, fungi, and protozoa decompose organic matter and minerals, releasing oxygen, carbon dioxide, and nitrogen to plants. Insects and worms burrow into the soil, redistributing soil material and creating channels for air and water movement. Animals trample and mix soil material, add and bury organic debris, and burrow into the ground. Surface plants add organic matter to the soil, create pores and channels with rooting networks, and

reduce erosion and the rate of surface water runoff. Their decomposed residue influences the soil's physical and chemical properties. This survey area has distinct native plant communities that are related to the environmental factors of soil formation.

Parent Material

Parent material is the unconsolidated mineral and organic material in which soil forms. It can be derived in place from the underlying bedrock (residuum) or transported by wind (eolian material), water (alluvium), or gravity (colluvium). A soil that formed in residuum derived from granite bedrock on a nearly level summit will be very different from a soil that formed in an alluvial stream deposit derived from limestone. The chemistry, structure, grain-size distribution, and other factors of parent material are important constituents in soil formation. The soils in this survey area formed in a wide variety of parent materials.

Topography

Topography influences soil formation through its effect on water movement and on the stability of soil material. The rate of surface water runoff and the extent of erosion by water or gravitational forces increase on steep slopes, lessening the amount of time available for soil formation. Northern aspects of steep slopes receive less solar radiation than southern aspects and consequently lose less moisture to evapotranspiration. Runoff from adjoining uplands collects in level or concave areas, where organic matter and sediments are dropped from the alluvial waters. On steep and very steep slopes, the soils commonly are unstable and erosion occurs faster than the processes of soil formation. These soils commonly are shallow and show minimal development of genetic horizons. Soils on lesser slopes tend to be more stable and develop distinct genetic horizons over time. In areas of alluvial deposition, the surface horizons are somewhat thicker and higher in content of organic matter.

The topography of the survey area ranges from broad, nearly level to gently sloping areas to steep areas near escarpments. Some areas are broken by deeply entrenched, rugged canyons and washes that have steep to nearly vertical escarpments. The washes and canyons have nearly level to gently sloping areas of alluvial deposits in drainageways.

Time

Time refers to the duration of the period that a parent material has been in place and has been influenced by other soil-forming factors. The age of a soil is related to the age or stability of the geomorphic surface on which it formed, not the age of the landscape. Mountains are much older than the alluvial and colluvial deposits at the base of the slopes of those mountains, but the surface of the more stable alluvial deposits may be much older than the more unstable side slopes. Certain soil characteristics require long periods to become well expressed. Other morphological features may develop in less time but this more rapid development may require conditions known to have occurred only in the distant past.

Young soils tend to lack expressions of soil development, whereas older soils generally have well developed genetic horizons. Soils on flood plains are subject to constant reworking and deposition of sediment during periods of flooding. Many soils on steep and very steep slopes are subject to the influence of gravity and erosion and thus do not have enough time to develop genetic horizons.

Landforms of the Survey Area

The survey area is part of the Sonoran and Southeastern Arizona Basin and Range Province, which is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys or basins. Landforms are not static; they are continually being created and eroded. Some landforms are hard to distinguish; their boundaries are not always sharp but fold and blend into one another naturally. The following paragraphs describe the major landforms recognized in the survey area and some of the soils associated with these landforms.

Flood plains are being formed from Holocene and present-day stream alluvium. Floodwaters in the survey area flow at low to very low slope gradients adjacent to basin floor and fan terraces. The soils on the flood plains receive periodic depositions of fresh alluvium, resulting in an irregular decrease in organic matter and weak or no soil profile development. The sediment load of the floodwater tends to be sandy to clayey. Typical soils on the flood plains in this survey area are the Cascabel, Gila, Glendale, Hantz and Vint series.

Alluvial fans are formed from Holocene and present-day material originating from mountains and hills or other upslope areas. Sediment loads are deposited when slope gradients change from upland positions to a lower segment on the landscape. An inherent feature of fan development is the continuously changing pattern of channels and loci of deposition (Cooke and Warren, 1973). Over a long period of time, these changes ensure the maintenance of fans formed through wide distribution of material on the surface (Cooke and Warren, 1973). The alluvial areas in this survey area generally have two forms: triangular alluvial fans, which formed from the high hills or the high fronts; and long and narrow or elongated fans inset between fan terraces. Typical soils on the alluvial fans in this survey area are the Combate, Stanford, and Hayhook series.

Stream terraces are the erosional remnants of Pleistocene to middle Holocene flood plains. The slopes are in the same general direction as those of the current flood plains. The soils on the terraces are underlain by stratified sand, gravel, or loamy or clayey sediments; or in some areas, by buried paleosols. The soils on stream terraces have been stable long enough for the formation of cambic and young calcic and argillic horizons. They are not subject to flooding. Typical soils on the stream terraces in this survey area are the Momoli and Laveen series.

Basin floors were developed during the late to mid Pleistocene, when the amount of effective moisture was greater than that of the present time. The soils on present-day basin floors possibly formed on two active landforms during the Pleistocene. These are alluvial fans and lake plains (playas) in enclosed basins where there is no water outlet. The two alluvial processes filled in the enclosed basin through sedimentation, which increased the thickness of the soil mantle. Eventually, enough sediment was deposited to raise the base level and allow drainage. Commonly, the soils on basin floors have several buried horizons representing relict paleosols. These soils generally have varying accumulations of gypsum and salts. The accumulation of gypsum is related to a high water table, which occurred at some time in the process of soil development. Soil affected by gypsum has a high to very high hazard of erosion. High concentrations of sodium and salts affect plant growth.

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Typical soils on the basin floors in this survey area are the Casa Grande, Contine, and Mohall series.

Fan terraces developed during the middle Pleistocene and early Holocene eras. They are relict alluvial fans, which are no longer sites of active deposition. They vary greatly in their makeup. The soils on fan terraces exhibit different stages of soil development, which is characterized by well developed argillic, calcic, gypsic, and cemented horizons. Fan terraces have been strongly dissected or eroded to the point where they are not subject to flooding or are subject to only rare flooding. They range from nearly level to steep. Commonly, the soils on the higher, steeper fan terraces closest to the mountain fronts have more rock fragments than the soils on the lower, nearly level fan terraces, which have very few rock fragments. Typical soils on the fan terraces in this survey area are the Beardsley, Kimrose, Sasabe, Stronghold, and Nahda series.

Pediments developed during the middle Pleistocene and early Holocene eras. They are broad, level or gently sloping, rock-floored erosion surfaces of low relief at the base of abrupt and receding mountains and are underlain by bedrock. They are bare in some areas but more commonly are partly mantled with a thin, discontinuous veneer of alluvium derived from upland masses and in transit across the surface. Pediments tend to have a rolling landscape. The depth to bedrock ranges from less than 20 inches to more than 60 inches. Typical soils on the pediments in the survey area are the Oracle, Romero, and Chiricahua series.

Hills and mountains are characterized by soil development that is highly dependent on the nature of the bedrock, such as its chemical composition, grain size, and hardness. The most influential soil-forming factors on the hills and mountains are time and the slope gradient of the bedrock. The soils on these landforms vary greatly in soil development. Some show no evidence of development, and others have well developed argillic, calcic, and/or petrocalcic horizons. The soils that show little or no evidence of horizon development generally are on the steeper slopes, where erosional activity is greatest. The soils that have well developed horizons generally are on gently sloping to moderately steep slopes, where the hazard of erosion is slight or moderate. Typical soils on the steeper hills and mountain are Turquoise, Lampshire, and Mabray series; and soils on moderate slopes are Collorbutton, Cherrycow, Eskiminzin, Brunkcow, and Nugget series.

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Glossary

- Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.
- Alkali (sodic) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.
- Alluvial fan.** A low, outspread, relatively flat to gently sloping mass of loose rockmaterial that is shaped like an open fan or segment of a cone. This alluvial material is deposited by a stream at the place where it issues from a narrow mountain valley into a plain or broad valley, or where a tributary stream joins a main stream, or wherever constriction in a valley abruptly ceases or the gradient of the stream suddenly decreases. The fan is steeper near the mouth of the valley, where its apex points upstream, and it slopes gently and convexly outward with gradually decreasing gradient.
- Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.
- Argillic horizon.** A subsoil horizon characterized by an accumulation of illuvial clay.
- Aspect.** The direction in which a slope faces.
- Association, soil.** A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.
- Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:
- | | |
|-----------------|--------------|
| Very low | 0 to 3 |
| Low | 3 to 6 |
| Moderate | 6 to 9 |
| High | 9 to 12 |
| Very high | more than 12 |
- Backslope.** The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.
- Badland.** Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.
- Basin Floor.** A general term for the nearly level to gently sloping, bottom surface of an intermountain basin (bolson). Component landforms include playas, broad alluvial flats containing ephemeral drainageways and relict alluvial and lacustrine surfaces that rarely if ever are subject to flooding. Where drainage systems are

well-developed, alluvial plains are dominant and lake plains are absent or of limited extent. Basin floors grade mountainward to distal parts of the piedmont slopes.

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.

Breccia. A coarse grained, clastic rock composed of angular, broken rock fragments held together by a mineral cement or a fine grained matrix.

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

Calcic horizon. This is a horizon of calcium carbonate or calcium and magnesium carbonate accumulation. If the texture of the soil is greater than 18 percent clay the calcic horizon will be more than six inches thick and have more than 15 percent calcium carbonate equivalent and at least 5 percent calcium carbonate equivalent is required.

Calcium carbonate. Is used interchangeably with lime or limy.

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

Cambic horizon. A horizon characterized by the formation of calcium carbonate coatings in root channels and on the surface of gravel. In some cases, clay bridges have begun to form between sand grains and clay films in root channels.

Central Arizona Project Canal. CAP canal and associated levees, water retention areas, and roads are located in the northwest corner of the survey area extending from Baseline Road southwest to Arizona Farms Road. The area is about 0.1 mile wide and is fenced on both sides. The levees are about 20 feet above the surrounding landscape. The levees and roads are built from surrounding materials and are generally fine to medium textured. The water retention areas are a result of borrowing material to build the levees and roads. These areas will pond water. Mesquites and annuals dominate the vegetation. The retention areas are utilized for feed and water by livestock.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a chanter.

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

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

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

Coarse textured soil. Sand or loamy sand.

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

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in

diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

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

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

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

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

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

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

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

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

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

Distal. Said of a sedimentary deposit consisting of fine clastics and deposited farthest from the source area. Opposite of proximal.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Effervescence. In the field, cold 1N hydrochloric acid is used to test for carbonates. The amount and expression of effervescence are affected by size distribution and mineralogy as well as the amount of carbonates. Consequently, effervescence cannot be used to estimate the amount of carbonate. Four classes of effervescence are recognized: *noneffervescent*—few to no bubbles seen, *slightly effervescent*—bubbles readily seen, *strongly effervescent*—bubbles form low foam, *violently effervescent*—thick foam forms quickly.

Eluviation. The movement of materials 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. Material transported and deposited by the wind. It includes earth material, such as sand, silt, and clay, and chemical material, such as calcium carbonate.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

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

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

Fan Alluvium. Unconsolidated clastic materials deposited on alluvial fans and fan terraces by running water, including gravel, sand, silt, clay and various mixtures of these.

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

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

Fine textured soil. Sandy clay, silty clay, or clay.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flooding Frequency Classes. *None*—No reasonable possibility of flooding (near 0 percent chance of flooding in any year). *Rare*—Flooding unlikely but possible under unusual weather conditions (from near 0 to 5 percent chance or near 0 to 5 times in 100 years). *Occasional*—Flooding is expected infrequently under usual weather conditions (5 to 50 percent chance of flooding or 5 to 50 times in 100 years). *Frequent*—Flooding is likely to occur often under usual weather conditions (more than a 50 percent chance of flooding or more than 50 times in 100 years). *Common*—Occasional and frequent classes can be grouped for certain purposes and called common flooding.

- Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.
- Fluvial.** Of or pertaining to rivers; produced by river action, as a fluvial plain.
- Forb.** Any herbaceous plant not a grass or a sedge.
- Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
- Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.
- Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
- Gravelly soil material.** Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.
- Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.
- Hard bedrock.** Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.
- Hardpan.** A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.
- Hill.** A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and depends on local usage.
- Holocene.** An epoch of the Quaternary period from the end of the Pleistocene to the present time. Approximately 0 to 10,000-12,000 years BP.
- Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:
- O horizon.—An organic layer of fresh and decaying plant residue.*
- A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.*
- E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.*
- B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.*
- C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.*
- Cr horizon.—Soft, consolidated bedrock beneath the soil.*

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

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

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Inclusions. Soil components or miscellaneous areas that are not identified in the named map unit. Many areas of these components are too small to be delineated separately or cannot be identified by practical field methods or are deliberately placed in map units to avoid excessive detail on the map or legends. These are two types of inclusions. Similar inclusions are the named components in characteristics and properties and have the same major interpretations. Contrasting inclusions (Minor Components) differ appreciably in one or more properties, and the differences generally are great enough to affect major interpretations.

Induration. The hardening of a soil horizon by chemical action to form a hardpan.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

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 varies 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

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives groundwater discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

- Ksat.** Saturated hydraulic conductivity. (See Permeability.)
- Lacustrine deposit.** Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.
- Landform.** Any recognizable physical form or feature of the earth's surface having a characteristic shape and resulting from natural causes.
- Lava flow.** A lateral surficial outpouring of molten lava from a vent or a fissure; also, the solidified body of rock that is so formed.
- Leaching.** The removal of soluble material from soil or other material by percolating water.
- Linear extensibility.** Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at 1/3-bar or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.
- Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.
- Lime.** Chemically, lime is calcium oxide, but as the term is commonly used it also refers to calcium carbonate and calcium hydroxide.
- Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.
- Low strength.** The soil is not strong enough to support loads.
- Masses.** Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.
- Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.
- Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.
- Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.
- Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.
- Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.
- Moderately fine textured soil.** Clay loam, sandy clay loam, or silty clay loam.
- Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.
- Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.
- Mottling, soil.** Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

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

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies that lack visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

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

Paleosol. A soil that formed on a landscape in the past and that has distinctive morphological features resulting from a soil-forming environment that no longer exists at the site. The former pedogenic process was either altered because of external environmental change or interrupted by burial.

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.

Pediment. A broad, flat or gently sloping, rock-floored erosion surface or plain of low relief. It typically was developed by subaerial agents in an arid or semiarid region at the base of an abrupt and receding mountain front or plateau escarpment and is underlain by bedrock that may be bare but more often is partly mantled with a thin and discontinuous veneer of alluvium derived from the upland masses and in transit across the surface.

Percolation. The movement of water through the soil.

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

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

Petrocalcic horizon. A continuous or fractured, cemented or indurated calcic horizon cemented by carbonates and some silica. This is the same as a lime cemented hardpan or a cemented calcium carbonate hardpan.

Petronodes. Petronodes are thought to have formed from calcium and magnesium that precipitated out during periods of a fluctuating seasonal water table and under a climate much wetter than that of the present. Repeated wetting and extreme drying of the soil may have contributed to nodule development. The nodules have no internal organization and break down completely in hydrochloric acid but not in water.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping. 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.

Pliocene. An epoch of the Tertiary period, after the Miocene and before the Pleistocene. Approximately 1,640,000 to 5,200,000 years BCE.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proximal. Said of a sedimentary deposit consisting of coarse clastics and deposited nearest the source area. Opposite of distal.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed.

Soil Survey of Eastern Pinal and Southern Gila Counties, Arizona

These zones are indications of the chemical reduction of iron resulting from saturation.

- Redoximorphic features.** Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.
- 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.
- 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 groundwater runoff or seepage flow from groundwater. Runoff of water from a soil is determined by the slope percentage and the hydrologic group.
- Saline soil.** A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.
- Salinity.** The degree to which a soil is affected by soluble salts. The amount of total salts in the soil is ascertained by measuring the conductivity of a saturated soil extract. The conductivity is measured in decisiemens per meter (dS/m), which are the same as millimhos per centimeter (mmhos/cm). Classes of salinity are *nonsaline*, 0 to 2 dS/m; *very slightly saline*, 2 to 4 dS/m; *slightly saline*, 4 to 8 dS/m; *moderately saline*, 8 to 16 dS/m; and *strongly saline*, 16 to 32 dS/m.
- Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.
- Sandstone.** Sedimentary rock containing dominantly sand-sized particles.
- Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.
- Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
- Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.
- Shale.** Sedimentary rock formed by the hardening of a clay deposit.
- Sheet erosion.** The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.
- Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, building foundations, dams, and other structures. It can also damage plant roots.
- Silica.** A combination of silicon and oxygen. The mineral form is called quartz.
- Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.
- Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a

similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 3 percent
Gently sloping or undulating	3 to 7 percent
Strongly sloping or rolling	7 to 15 percent
Moderately steep or hilly	15 to 25 percent
Steep	25 to 55 percent
Very steep	55+ percent

Slope alluvium. Sediments gradually transported on mountain or hill slopes primarily by alluvial processes and characterized by particle sorting. In a profile sequence, the sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. They contrast with unsorted colluvial deposits because of the sorting of rounded or subrounded gravel or cobbles and buried peds.

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

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

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

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

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

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

- Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.
- Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.
- Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.
- Stream alluvium.** Unconsolidated clastic material deposited on stream terraces by running water, including gravel, sand, silt, clay and various mixtures of these.
- Stream terrace.** One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the dissected remnants of an abandoned flood plain, stream bed, or valley floor produced during a former stage of erosion or deposition.
- Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).
- Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.
- Substratum.** The part of the soil below the solum.
- Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.
- Summit.** The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.
- Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."
- Surface soil.** The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.
- Taxadjunct.** 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 taxadjunct to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjunct only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.
- Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.
- Terrace (geologic).** An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.
- Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."
- Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.
- Toeslope.** The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are

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constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

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.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

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

Urban land. Areas of soil so altered by construction or obscured by structures and pavement that identification of the soil is difficult or impossible.

Valley fill. Alluvium deposited by heavily loaded streams.

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

Water erosion classes. Water erosion is determined by the soil erodibility factor (K factor) of the soil's surface texture and percent slope. The K factor is a measure of the susceptibility of a soil to particle detachment and transport by rainfall. It is a quantitative value, experimentally determined.

		Percent	Slope	
K factor	0 to 5	5 to 15	15 to 30	30+
0.02 - 0.20	Slight	Slight	Moderate	Severe
0.24 - 0.37	Slight	Moderate	Severe	Severe
0.43 - 0.69	Moderate	Severe	Severe	Severe

For soils in which the content of gypsum is 5 percent or more, the hazard of water erosion is as follows:

		Percent	Slope	
K factor	0 to 5	5 to 15	15 to 30	30+
0.02 - 0.20	Slight	Moderate	Severe	Severe
0.24 - 0.37	Moderate	Severe	Very Severe	Very Severe
0.43 - 0.69	Severe	Very Severe	Very Severe	Very Severe

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

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

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

Wind Erodibility Group. A wind erodibility group (WEG) is a collection of soils that have similar properties affecting their resistance to soil blowing. The groups indicate the susceptibility to blowing. The lower the number the more susceptible the soil is to wind erosion. The hazard of wind erosion for each of the various wind erodibility groups is as follows:

- 1 very high
- 2 high
- 3 moderately high
- 4, 4L moderate
- 5 – 7 slightly
- 8 very slightly

A brief description of each wind erodibility group is given under the heading “Physical Properties.”

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