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Regents of the University of
California (Agricultural
Experiment Station)

Soil Survey

Sequoia National Forest California



How To Use This Soil Survey

General Soil Map

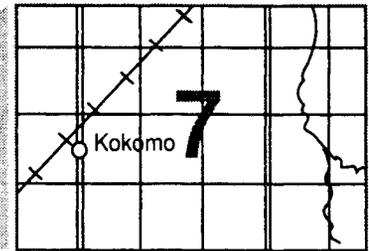
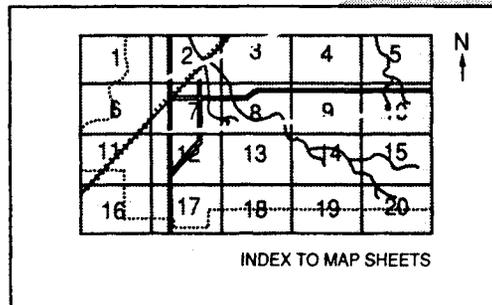
The general soil map, which is the small scale map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These 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**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

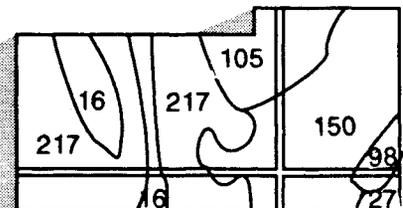


MAP SHEET

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



MAP SHEET



AREA OF INTEREST

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

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

Sequoia National Forest Area, California

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, and state agencies including the Agricultural Experiment Stations. The fieldwork and technical quality control for this survey were conducted by the Forest Service. The correlation of the soils was conducted by the Soil Conservation Service in consultation with the Forest Service. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of the program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1973-79. Soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Forest Service and the Soil Conservation Service. The soil survey area consists of the Sequoia National Forest and the part of the Inyo National Forest in Tulare County.

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

Cover: View of Giant Sequoia

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Forward

The Soil Survey of Sequoia National Forest Area, California, in parts of Fresno, Kern, and Tulare Counties, was designed to facilitate broad forestwide resource management planning and to increase the knowledge of our environment. It contains predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil.

This soil survey has been prepared primarily for forest resource planners and managers. It is useful for preliminary project planning, for identifying general soil management considerations, and for evaluation of more intensive soil survey needs. The survey should be used for detailed resource management planning and project level planning and design only after field verification.

Great differences in soil properties can occur even within short distances. Soil may be shallow to bedrock and incapable of producing commercial timber. They may be seasonally wet or subject to flooding. A low available water capacity makes a soil poorly suited to reforestation. A high water table makes a soil suitable for use as summer range.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each soil map unit is shown on detailed soil maps. Each kind of soil in the survey area is described, and information is given about each soil for specific uses.

This soil survey can be useful in the conservation, improvement, and productive use of soil, water, and other resources.



SANDRA H. KEY
Forest Supervisor
Sequoia National Forest



Location of Sequoia National Forest Area, California

Soil Survey of Sequoia National Forest Area, California

By Richard O. Hanes, Sarah E. Plocher and Dan Z. Martynn

Fieldwork by Terry V. Brock, James T. Bayer, Richard O. Hanes, and R.L. Watson, Forest Service

General Nature of the Survey Area

This section briefly discusses Sierra Nevada geomorphology, and the physiography, drainage, geology, climate, and vegetation of the survey area

Sierra Nevada Geomorphology

The Sierra Nevada mountain range, which makes up the province, runs in a northwesterly direction, turning southwest at the southern end. The crest of the range climbs from 8,000 feet in the north to Mt. Whitney and rival peaks in the south which rise over 14,000 feet. In cross section, the asymmetrical Sierra range slopes gently to the western slope as the marine air masses move inland and are forced up and over the range. Deeply incised river canyons drain this well watered side of the range. The eastern scarp is in a rain shadow and has shorter, steeper canyons.

The present form of the Sierra Nevada mountains is a recent development. Today's range is the product of hundreds of millions of years of geologic work. From about 230 to 420 million years ago the area that is now the Sierra Nevadas was under a shallow sea. Great quantities of coarse, unsorted sediment and volcanic debris accumulated, causing the sea bed to sink. These continental and marine sediments were lithified to form a complex series of paleozoic rocks.

About 132 million years ago these rocks were raised and deformed into a northwest trending fold. Lava rose under the fold and mixed with the rocks to form the huge granitic batholith-over 400 miles long, 80 miles wide and 12 miles thick. The area eroded long for millions of years to form a broad upland of low hills and deep gorges.

About 25 million years ago, a period of deformation and volcanic activity began. The eastern edge was lifted along the Sierra Nevada fault and the batholith was tilted to the west. Volcanoes covered the northern and

central part of the range under a blanket of lava and continual erosion modified the surface. About 3 million years ago the final uplift brought the range to their present height.

During the ice ages within the last one million years, the crest of the Sierra Nevada was extensively glaciated. The last glacial period ended 25,000 to 11,000 years ago and extended a far south as the headwaters of the Little Kern River.

Physiography, Drainage and Geology

The Sequoia National Forest Soil Survey Area is at the southern end of the Sierra range where it turns southern to close off the Great Valley. Cirque Peak At 12,910 feet on the northern boundary of the Golden Trout Wilderness is the highest point in the survey area. The lowest point is 990 feet at the south-western corner where the Kern River leaves the National Forest.

Four major rivers drain the survey area. The Kings, Kaweah, and Tule Rivers flow almost due west through deep canyons in the western portion of the Area. The Kern River, with its headwaters near Mt. Whitney flows due south 70 miles before turning westward to the San Joaquin Valley. The Kern drained the central and eastern portions of the survey area and is impounded at Lake Isabella.

The deep Kern River Canyon separates the southern portion of the survey area into distinct regions. The Breckenridge Mountains are separated from the Greenhorn Mountains as the river turns westward from Lake Isabella. The Breckenridge Mountains are characterized by oak grasslands at the low elevation, a chaparral zone and a small area of commercial timber at the high elevations.

Upstream from Lake Isabella, the South Fork of the Kern River divides the Piute Mountains and Scodie

Mountains from the Kern Plateau. The Piutes are similar to the Breckenridge Mountains but have a larger commercial forest zone. The eastern portion of the Piutes exhibits the desert influence, supporting Joshua tress and Pinyon Pine. The Scodie Mountains are a distinct desert mountain region.

The North Fork of the Kern River divides the Greenhorn Mountains from the Kern Plateau. The Greenhorns rise from the floor of the San Joaquin Valley with oak-grass lands at low elevations, an extensive chaparral belt at mid elevations and a broad belt of commercial forest land at higher elevations. On some of the highest mountains there are subalpine trees and shrubs. The eastern side of the Greenhorn Mountains drops steeply into the Kern River Canyon.

The Kern Plateau region is across the upper Kern Canyon from the Greenhorn range. This mountainous "Plateau" is generally covered by mixed conifer forests with red fir forests at higher elevations. Subalpine trees and shrubs grow on the highest mountain tops.

The northern island of the survey area, the Hume Lake Ranger District, is isolated by administrative rather than geomorphic boundaries. The lines are drawn to separate National Park land from National Forest land.

The rock units in the survey area include metamorphic, plutonic and volcanic rocks. These materials range in age from recent to more than 135,000,000 years old (pre-cretaceous).

The granitic batholith which forms the body of the Sierra Nevada is composed of many smaller "plutons," each formed by a separate intrusion. The granitic rock in the plutons varies in composition. "Granitic rock" is a general term which includes several rock types with differing combinations of quartz, micas and feldspars. Intrusive igneous rocks in the survey area range from true granite to grandiorite.

The granitic rocks weather in several different forms. At high elevations water seeps into fractures, freezes and expands, hewing off chunks of virtually unweathered granite. In some places bald granitic domes are formed by exfoliation or "leafing away" of layers of rock. The Dome Land Wilderness in the southern Kern Plateau takes its name from the many domes in that area weathers in place by chemical and physical means leaving coarse individual mineral grains.

Volcanic rocks are uncommon in the Survey Area, but where they occur, they are mostly flows of dark gray olivine basalt. Tertiary volcanic rocks occur on the southern Kern Plateau, in the area of the Forks of the

Kern River, and the Hume Lake Ranger District. In addition, Monache Mountain and Templeton Mountain on formed the northern Kern Plateau are volcanic. These are andesite domes by the extrusion of molten rock.

The metamorphic rock in the survey area consists of undifferentiated metasedimentary and metavolcanic rocks. These rocks form roof pendants and are remnants of the ancient lake bed that once covered the Sierra. The formations include such rocks as phyllite, quartzite, schist, marble, gneiss, and metamorphosed pyroclastics. The roof pendants are scattered throughout the survey area.

Recent alluvial deposits occur in the survey area in the form of alluvial fans, stream terraces, upland meadows, and colluvial deposits.

There are no faults classified as "active" within the survey area. The Kern Canyon fault which trends north-south, runs from the headwaters of the Kern, through Lake Isebella and on south between the Breckenridge and the Piute Mountains. From Lake Isabella northward the Kern River has cut its canyon in the zone weakened by the fault stress. Other faults occur, but none so prominent.

Climate

Generally, the survey area is characterized by a Mediterranean climate with cool, moist winters and warm, dry summers.

Mean annual precipitation ranges from 10 to 50 inches, with 79 to 90 percent of it falling between November and April when evapotranspiration is at a minimum. In the montane and subalpine areas, most of the precipitation during this period is in the form of snow. Snowmelt rates range from rapid to moderate, with approximately 60 percent of the area having rapid snowmelt.

Rainfall intensities range from moderate to high. Approximately one-half of the commercial forest land is in the high intensity class, with rates of 6 to 7 inches in 24 hours. These events occur once within a 5-year period. The balance of the area receive 2 to 6 inches in 24 hours.

Potential evapotranspiration (PET) is the return of water vapor to the atmosphere through evaporation and transpiration when water supply is not a limiting factor (i.e. the soil would always contain more water than the plants need).

The average values of PET by plant community have not been determined for the survey area, however, the

following information (1) (3) is relatively useful (Figure 1).

The Growing Season¹

The growing season for most foothill plants coincides with the rainy months from autumn through spring. By mid-summer all but the most drought-resistant foothill plants, or those growing near perennial source of moisture—riverbanks, for example—become dormant and remain so until the arrival of rain in the fall. Trees and shrubs may simply shut down operations for the duration of the dry season; most herbs are annuals which scatter their seeds before the drought begins. Since most foothill plants are active during the winters, they are subject to periodic frosts, which they routinely survive.

Above the foothills, persistent winter snow cover shifts the growing season to the summer months. Although the disappearance of snow cover in the spring and its reappearance in the fall determines the outer possible limits of the growing season, onset and end of growth for most plants is actually triggered by other factors. Each species has particular requirements with regard to such factors as air temperature, soil temperature, soil moisture, and the number of hours of sunlight each day, all of which must be met before dormancy is broken. Plants thereby reduce the possibility of commencing growth too soon—as during a dry winter, when snow might be absent in places but air temperatures and daylight hours insufficient for survival. During a normal winter, it is rising air temperature, of course, that is primarily responsible for the melting of

the snowpack, and this event in turn profoundly affects soil temperatures and moisture levels.

Since air temperatures drop as elevation increases, the growing season also becomes shorter, beginning progressively later and ending progressively earlier as one moves upslope. The length of the growing season for each vegetation zone in the Sierra (including the Central Valley as a point of comparison) is roughly as follows:

Central Valley	7-11 months
Foothill zone	6-10 months
Lower montane zone	4-7 months
Upper montane zone	3-4 1/2 months
Subalpine zone	7-9 weeks
Alpine zone	6-8 weeks
Pinyon-Sagebrush zone	2-5 months

The relatively unimportant role of frost in determining these growing seasons is apparent when one considers that during the 3-4 1/2 months available for plant growth in the upper montane zone, the frost-free period is only 40-70 days long. In the subalpine and alpine zones, there are no frost-free periods.

Although the first permanent snow of autumn marks the latest dates at which plant growth is possible in the upper zone, most species have begun to shut down for the winter by the time storms arrive. Once again, as with the breaking of dormancy in the spring or early summer, air temperature, soil moisture, and the number of daylight hours are as important as snow in determining its resumption in the late summer or early autumn.

Figure 1. Average Annual PET by Plant Community

Vegetation Type	Potential Evapotranspiration Inches	PET as a Percentage of Mean Annual Precipitation
Pinyon-Juniper	15	97
Grass	16	--
Foothill	18	69
Lodgepole Pine	19	58
Mixed Chaparral	20	77
Mixed Conifer	22	51
True Fir	24	34

¹ Reprinted by permission of Sierra Club Books from A SIERRA CLUB NATURALIST'S GUIDE TO THE SIERRA NEVADA by Stephen Whitney, copyright 1979 by Stephen Whitney.

Vegetation

Plant community names used in the report are based on the traditional plant communities in A California Flora (5) (6) and The Vascular Plant Communities of California (8). The following is a list of the plant communities in the survey area and the series that may be in each plant community. The plant series names are based on CALVEG, A Classification of California Vegetation (7). All of the series given for a plant community may not be on a specific site under that community.

Yellow Pine Forest Community - the plant series in this community are Ponderosa Pine, Jeffrey Pine, Mixed Conifer-pine, Mixed Conifer-fir, Western Juniper, Digger Pine, Pinyon Pine, Quaking Aspen, Black Oak, Canyon Live Oak, Valley Oak, Ceanothus, Manzanita, Prunus, Mt. Mahogany, Bush Chinquapin, Mt. Misery, Shin-oak, Basin Sagebrush, Bitterbrush, Rabbitbrush, Wild Rose, Bromegrass, Fescue, Muhlenbergia, Needlegrass, Wild Rye, and Fern.

Mixed Conifer Forest Community - the plant series in this community are Pondersosa Pine, Jeffrey Pine, Big Tree, Mixed Conifer-pine, Mixed Conifer-fir, White Fir, White Fir, Black Oak, Ceanothus, Manaznita, Prunus, Bush Chinquapin, Mt. Misery, Wild Rose, Wild Rye, and Fern.

White Fir Forest Community - the plant series in the this community are Big Tree, Mixed Conifer-fir, White Fir, Red Fir, Lodgepole Pine, Ceanothus, Manzanita, Prunus, Brush Chinquapin, Mt. Misery, and Wild Rye.

Red Fir Forest Community - the plant series un the community are Red Fir, Western White Pine, Lodgepole, Quaking Aspen, Ceanothus, Manzanita, Prunus, Bush Chinquapin, and Wild Rye.

Lodgepole Pine Forest Community - the plant series in this community are Western White Pine, Lodgepole Pine, Quaking Aspen, and Fern.

Foxtail-Limber Pine Community - the plant series in this community are Western Juniper, Lodgepole Pine,

Limber Pine, Foxtail Pine, Mt. Mahogany, Rabbitbrush, and Fern.

Mixed Chaparral Community - the plant series in this community are California Bay, Canyon Live Oak, Interior Live Oak, Chamise, Ceanothus, Manzanita, Mt. Mahogany, Shin-Oak, Scrub Oak, Bromegrass, and Fern.

Montane Chaparral Community - the plant series in this community are Canyon Live Oak, Ceanothus, Manzanita, Prunus, Mt. Mahogany, Bush Chinquapin, Mt. Misery, Shin-Oak, Scrub Oak, Basin Sagebrush, Bitterbrush, Rabbitbrush, Bromegrass, and Fern

Piute Cypress Woodland Community - the plant series in this community are Digger Pine, Piute Cypress, California Juniper, Ceanothus, Manzanita, Mt. Mahogany, Rabbitbrush, Needlegrass, and Fern.

Pinyon-Juniper Woodland Community - the plant series in this community are Pinyon Pine, California Juniper, Mt. Mahogany, California Salvia, Basin Sagebrush, Bitterbrush, Rabbitbrush, Opuntia, Needlegrass, Ricegrass, and Fern.

Foothill Woodland Community - the plant series in this community are Digger Pine, California Bay, Bigleaf Maple, Canyon Live Oak, Interior Live Oak, Blue Oak, Valley Oak, Sycamore-Ash, California Buckeye, Ceanothus, Manzanita, California Buckwheat, Encelia, Bromegrass, Fescue, Muhlenbergia, Needlegrass, Wild Oats, and Fern.

Joshua Tree Woodland Community - the plant series in this community are Joshua Tree, Opuntia, Bromegrass, and Ricegrass.

Sagebrush Scrub Community - the plant series in this community are Western Juniper, California Buckwheat, Salvia, Saltbush, Basin Sagebrush, Bitterbrush, Rabbitbrush, Opuntia, Bromegrass, Needlegrass, and Ricegrass.

Montane Meadow Community - the plant series in this community are Lodgrpole Pine, Willow, Mulenbergia, Sedge, Wiregrass, and Fern.

How this Survey was Made

This Order 3 soil survey (9) has followed the directives and guidelines in the Forest Service Manual and Handbooks. It has also followed the concepts, procedures, and guidelines of the National Cooperative Soil Survey as specified in the *Soil Survey Manual* (12), the *National Soils Handbook* (11), and the soil classification system as stated in *Soil Taxonomy* (13).

Soil Scientists begin the inventory by collecting, studying, and correlating all the existing data and information concerning the survey area (National Forest) that is related to soil genesis and morphology. This includes lithological, geomorphological, topographical and elevational, climatic, vegetative, and existing soil survey data both within and adjoining the survey area.

This data and information was assimilated and transferred to a single base map of suitable scale and accuracy forming the beginning soil map unit delineations or a schematic map. With the schematic map and aerial photo field sheets (stereo-pair coverage) in hand, the soil scientist made a reconnaissance study of the survey area. At this time, the delineations on the schematic map are checked for accuracy of content and location. The aerial photos were studied stereoscopically and the photo images were compared to the conditions found on the ground to insure that later recognition by photo interpretation would be credible. Lithologic, geomorphic, soil, and vegetative characteristics were recognized and recorded in field notes, on the schematic map, and on the aerial photo field sheets.

Using the augmented and corrected schematic map, field notes, and an understanding of how the photo images relate to actual conditions on the ground, the soil scientist delineated map units on the aerial photographs. The map units corresponded to segments of the landscape having similar landform, vegetative cover, and soils as determined by a knowledge of ground conditions and by stereoscopic aerial photo interpretation. These aerial photos with the delineated map units and delineation symbols became the exploratory or preliminary soils map.

With the aerial photo (exploratory soils maps) and a field stereoscope in hand, the soil scientist examined on the ground as many delineations of each map unit as was feasibly possible, considering the access and time allowed to complete the survey. In this way, each different map unit was examined, studied, and described by aerial photo interpretations and on-the-ground investigation. However, because of the design of the survey, Order 3 in intensity (9), and the time allotted for its completion, every delineation of each different map unit was not

visited and examined on the ground. Those delineations with no easy access were rarely visited other than by aerial photo interpretation. In this way, possibly one-third to one-half of the delineations on the field sheets and maps would not have been entered and examined by an on-the-ground investigation. *This is one of the main aspects of this survey that limits its reliability. It is one reason that the survey is not suitable for project planning without field verification.*

As each map unit was visited and examined, individual soils were recognized, studied, described, classified, and enough data was collected to furnish the information needed to make interpretations and predictions concerning the use and management of each soil. *However, the exact location of each soil was not delineated.* The map units usually consist of a group of soils that occupy a particular portion of the landscape which has been delineated on the aerial photo field sheets. Depending on the area location and extent of the individual soils that are components of the delineated map unit, a map unit is called an association or complex of soil components. The soil scientist makes a field and aerial photo examination to estimate the soil component percentage composition for each map unit. These map units *do not* necessarily consist of similar soils. They consist of geographically associated soils that may be, and usually are, quite different in their characteristics and suitability for use and management. *These are other aspects of the survey that limit its reliability and make it not suitable for project planning without field verification.*

This field examination and study, and the associated correction and refinement of the aerial photo field sheets, produces the Order 3 intensity soil maps called for in this system of survey.

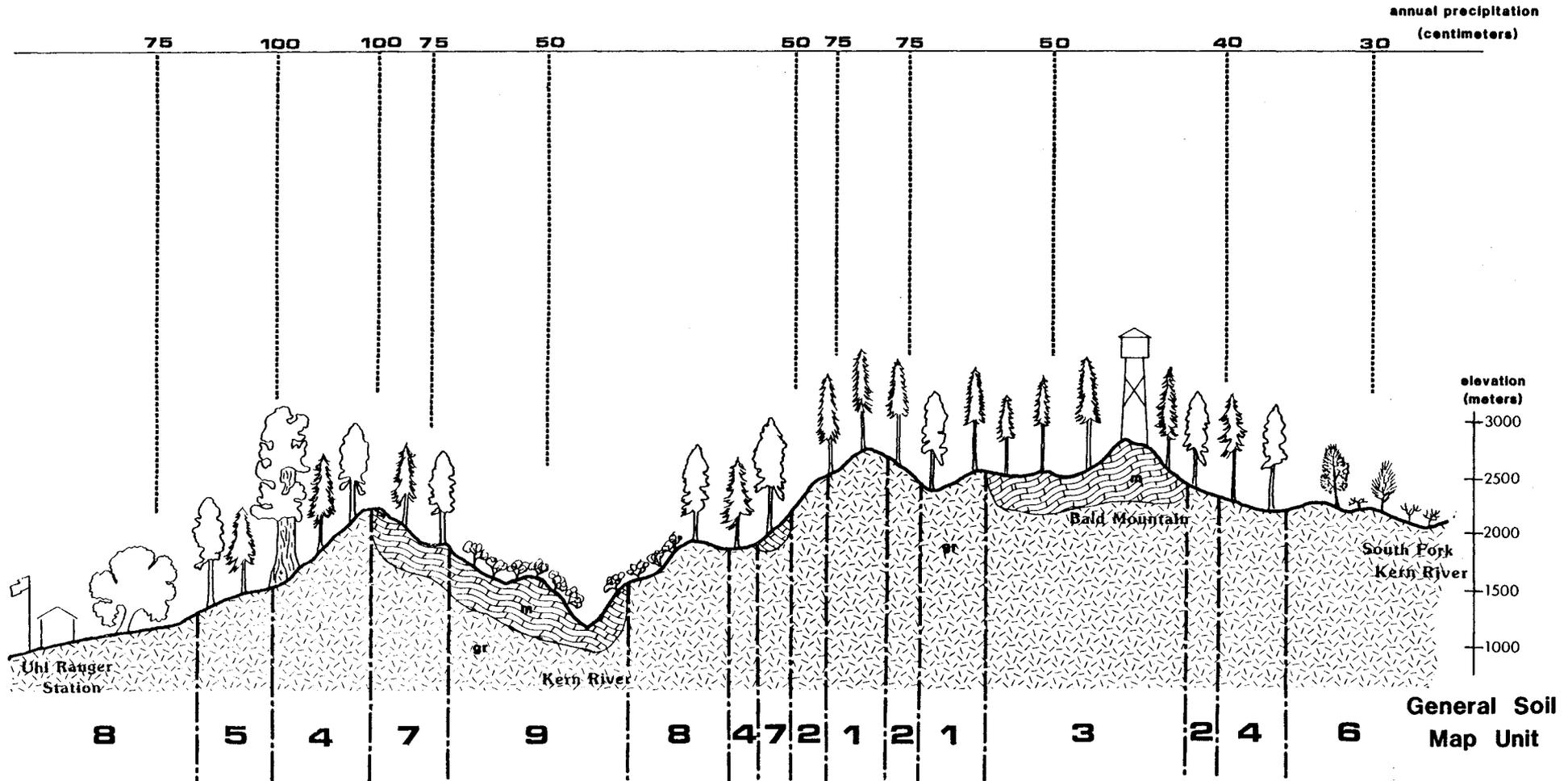
The interpretations and predictions concerning use and management found in this report are based on the soil scientist's knowledge and understanding of the conditions recognized and measured in the time allotted to this inventory. By classifying the soils, the soil scientist can also, with acceptable reliability, bring information concerning use and management of a particular soil from other survey areas where this same soil occurs and has been recognized and studied. Because of the time allocation for the completion of this survey, these use and management interpretations and predictions should be considered as first or second approximations due to the relatively few examinations and measurements that have been made. *This is still another aspect of the survey that limits its reliability and makes it not suitable for project planning without field verification.*

Despite the cautions that have been made in the above paragraphs concerning the use of this survey information

for project level planning, it is adequate and reliable for its intended and designed purpose: a base for a Forest-

wide system of land management planning.

PHYSIOGRAPHIC PROFILE



General Soil Map Units

The general soil map units which consist of many individual soils. Each map unit contains soil with similar parent rock material and similar soil temperature regimes. A map unit typically is made up of one or more soils of major extent and several soils of minor extent. Map units are named for the major soils occurring in the unit. The soils in one unit can occur in other units. The soils are classified at the series level, family level, or at a higher taxonomic level.

The map furnishes a broad perspective of the soils in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. General areas which are capable of timber production or spring-summer range can be identified on the map. Likewise, general areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of the generalization of map units and the small scale of the map, the location of specific soils are not shown. The map and map unit information is not suitable for Forest or project level land management planning. They give a very general overview of soil conditions and are suitable for State or Regional planning.

Each of the 10 map units are described in the following pages. Figure 2 - Physiographic Profile shows the general landscape, elevation, and precipitation for each general soil map unit.

1. Cagwin-Toem-Rock outcrop

Moderately deep and shallow, excessively drained soils, and Rock outcrop; on mountainsides and ridges.

The map unit occurs on mountainsides and ridges. The soils formed in residuum from highly weathered granitic rock. Elevation ranges from 6,400 to 9,910 feet and the means annual precipitation ranges from 12 to 51 inches.

The major plant communities in this unit are Red Fir Forest, Lodgepole Pine Forest, Montane Chaparral, and Foxtail-Limber Pine Forest.

This unit makes up approximately 10 percent of the survey area. It is about 45 percent Cagwin soils, 25 percent Toem soils, and 15 percent Rock outcrop. The remaining 15 percent consists of minor components.

Cagwin soils are moderately deep and excessively drained. Slopes range from 5 to 75 percent. Typically, the profile is loamy sand over highly weathered granitic rock.

Toem soils are shallow and excessively drained. Slopes range from 5 to 75 percent. Typically, they have a loamy sand surface layer. The underlying material is loamy sand over highly weathered granitic rock.

Rock outcrop may occur as small isolated outcroppings or as massive exposures.

Minor components in this unit are the deep and well drained Nanny family and Cannell soils, the excessively drained Chesaw family and Sirretta soils, and the Monache and Monache Variant, drained soils that are under meadows.

Areas of this unit are used for limited summer range and limited timber production. Forage and timber production are reduced by areas of Rock outcrop and the low available water capacity of the shallow soils.

2. Rock outcrop-Cannell-Sirretta

Rock outcrop and, deep and moderately deep, well and excessively drained soils; on mountainsides and ridges.

This map unit occurs on mountainsides and ridges. The soils formed in residuum from highly weathered granitic rock. Elevation ranges from 5,580 to 10,600 feet and the mean annual precipitation ranges from 18 to 53 inches.

The major plant community in this unit are Red Fir Forest, Lodgepole Pine Forest, Montane Chaparral, White Fir Forest, and Foxtail-Limber Pine Forest.

This unit makes up approximately 8 percent of the survey area. It is about 25 percent Rock outcrop, 25 percent Cannell soils, and 15 percent Sierra soils. The remaining 35 percent consist of minor components.

Rock outcrop may occur as small isolated outcroppings or as massive exposures.

Cannell soils are deep and well drained. Slopes range from 5 to 75 percent. Typically, they have a sandy loam surface layer. The underlying material is sandy loam over highly weathered granitic rock.

Sierra soils are moderately deep and excessively drained. Slopes range from 5 to 75 percent. Typically, the surface layer is coarse sandy loam. The underlying material is very gravelly loamy sand over fractured hard granitic rock. This soils is 35 to 90 percent gravel and cobbles.

Minor components in this unit are the deep and rocky Nanny family soils, moderately deep and excessively drained Cagwin soils, warmer Chaix and Dome soils,

and the Monache, Monache Variant, and Monache Variant, drained soils that are under meadows.

Areas of this unit are used for timber production. Rock outcrop and rock fragment in soil limit potential timber productivity and impede harvest. Forage production is limited by areas of Rock outcrop and rock fragments in the soil, and by competition from conifers and shrubs.

3. Baldmountain-Rock outcrop-Glean Variant

Deep, well and somewhat excessively drained soils, and Rock outcrop; on mountainsides and ridges.

This map unit occurs on mountainsides and ridges. The soils formed in residuum from metasedimentary, undifferentiated metamorphic, or basic igneous rock. Elevation ranges from 6,790 to 10,010 feet and the mean annual precipitation ranges from 18 to 39 inches.

The major plant communities in this unit are Yellow Pine Forest, White Fir Forest, Red Fir Forest, and Montane Chaparral.

The unit makes up approximately 3 percent of the survey area. It is about 45 percent Baldmountain soils, 30 percent Rock outcrop, and 10 percent Glean Variant soils, 30 percent consists of minor components.

Baldmountain soils are deep and well drained. Slopes range from 5 to 75 percent. The surface texture is silt loam. The underlying material is silt loam over highly weathered metasedimentary rock.

Rock outcrop occurs as small isolated outcroppings and as massive exposures.

Glean Variant soils are deep and somewhat excessively drained. Slopes range from 5 to 75 percent. The surface texture is sandy loam. The underlying material is very gravelly fine sandy loam over highly fractured andesite. The soil is 50 to 80 percent rock fragments.

Minor components in this unit include Jumpe family soils which are deep, well drained and rocky. The granitic Cagwin, Cannell, Nanny family, and Toem soils are also minor inclusions.

Areas of this unit are used for timber production and limited summer range. Forage production is limited by competition from conifers and shrubs. Rock outcrop impedes timber harvest.

4. Rock outcrop-Chaix-Chawanakee

Rock outcrop and, moderately deep and shallow, somewhat excessively and well drained soils; on mountainsides and ridges.

This map unit occurs on mountainsides and ridges. Slopes are 5 to 75 percent. Elevation ranges from 2,990 to 9,090 feet and the mean annual precipitation ranges from 14 to 51 inches. Soils in this unit formed in residuum from granitic rock.

The major plant communities in this unit are Yellow Pine Forest, Montane Chaparral, White Fir Forest, and Mixed Conifer Forest.

This unit occupies 30 percent of the survey area. It is about 45 percent Rock outcrop, 25 percent Chaix, and 15 percent Chawanakee. The remaining 15 percent consists of minor components.

Rock outcrop occurs as small isolated outcroppings and as massive exposures.

Chaix soils are moderately deep and well to somewhat excessively drained. Typically, they have sandy loam surface textures. The underlying material is loam over highly weathered granitic rock.

Chawanakee soils are shallow and somewhat excessively drained. Typically, they have sandy loam surface textures. The underlying material is sandy loam over highly weathered granitic rock. Soils of minor extent include the deep and well drained Holland and Dome, the moderately deep Siskiyou family, the shallow Tollhouse soil and Brader family, and the deep Woolstaf soils derived from metasedimentary rock.

This unit is used for timber production and summer livestock range. Low available water capacity and areas of Rock outcrop limits timber production, and limited by competition from conifers and shrubs.

5. Holland-Hotaw

Deep and moderately deep, well drained soils; on foothills mountainsides, and ridges.

This map unit occurs on foothills, mountainsides, and ridges. Elevation ranges from 3,020 to 7,600 feet and mean annual precipitation ranges from 20 to 51 inches. Soils in this unit formed in residuum from granitic rock.

The major plant communities in this unit are Yellow Pine Forest, White Fir Forest, and Montane Chaparral.

This unit occupies 3 percent of the survey area. It is about 50 percent Holland soils and 15 percent Hotaw. The remaining 35 percent consists of minor components.

Holland soils are deep and well drained. The slopes range from 5 to 75 percent. Typically, they have sandy loam surface textures. The underlying material is clay loam over highly weathered granitic rock.

Hotaw series are moderately deep and well drained. Slopes range from 5 to 50 percent. Typically, the surface texture is sandy loam. The underlying material is sandy clay loam over highly weathered granitic rock.

Minor components include Rock outcrop, the deep and well drained Bohna, Dome, and Shaver soils, the moderately deep Chaix, and the shallow Chawanakee soils.

This unit is used for timber production and summer livestock range. In some area, precipitation limits timber production. Forage production is limited by the competition from conifers and shrubs.

6. Rock outcrop-Tollhouse

Rock outcrop and shallow, somewhat excessively drained soils; on mountainsides and ridges.

This unit occurs on mountainsides and ridges. Elevation ranges from 4,400 to 8,790 feet and the mean annual precipitation from 8 to 24 inches. Soils in this unit formed in residuum from granitic and metamorphic rock.

The major plant communities in this are Pinyon-Juniper Woodland and Sagebrush Scrub.

This unit occupies approximately 8 percent of the survey area. It is about 45 percent Rock outcrop and 45 percent Tollhouse family soils. The remaining 10 percent consists of minor components.

Rock outcrop occurs as small isolated outcroppings and as massive exposures.

Tollhouse soils are shallow and somewhat excessively drained. Slopes range from 5 to 75 percent. Typically, the soil is coarse sandy loam over highly weathered granitic rock.

Minor components in this map unit are the shallow somewhat excessively drained Cieneba soils, and the moderately deep and well to somewhat excessively drained Chaix soils.

This unit used for summer livestock range. The areas of Rock outcrop, shallow depth of the soils, and low precipitation limit forage production.

7. Woolstalf-Rock outcrop-Wind River family

Deep, well drained soils, and Rock outcrop; on mountainsides and ridges.

This map unit occurs on mountainsides and ridges. Elevation ranges from 4,010 to 8,790 feet and the mean annual precipitation ranges from 10 to 51 inches. Soils in this unit formed predominantly from undifferentiated metamorphic, metasedimentary, and metavolcanic rock.

The major plant communities in this unit are Yellow Pine Forest, Mixed Conifer Forest, Montane Chaparral, and White Fir Forest.

This unit occupies approximately 3 percent of the survey area. It is about 30 percent Woolstalf soils, 20 percent Rock outcrop, and 15 percent Wind River family soils. The remaining 35 percent consists of minor components.

Woolstalf soils are deep and well drained. They occur on slopes of 5 to 75 percent. Typically, the surface texture is gravelly fine sandy loam. The underlying material is gravelly fine sandy loam over weathered metasedimentary rock. The soil is 35 to 75 percent rock fragments.

Rock outcrop occurs as small isolated outcroppings and as massive exposures.

Wind River family soils are deep and well drained. They occur on slopes of 5 to 50 percent. Typically, the surface is loam. The underlying material is loam, gravelly loam and very gravelly sandy loam over fractured metasedimentary rock.

Minor components in this unit include granitic and non-granitic soils. Boomer soils are deep and well drained formed from metavolcanic rock. Hotaw Variant soils are moderately deep and well drained formed from metamorphic rock. Holland and Dome soils are deep and well drained and formed from granitic rock.

This unit is used for timber production and summer livestock range. Timber productivity is limited by areas of Rock outcrop and rock fragments in the soil. Rock outcrop also impedes harvest. In some areas low precipitation also limits vegetative production. Forage production is limited by competition from conifers and shrubs.

8. Rock outcrop-Cieneba-Auberry

Rock outcrop and shallow and deep, somewhat excessively and well drained soils; on foothills, canyonsides, mountainsides, and ridges.

This map unit occurs on foothill, canyonsides, mountainsides, and ridges. The soils formed in residuum from granitic rock. Elevation ranges from 980 to 7,710 feet and the mean annual precipitation ranges from 8 to 40 inches.

The major plant communities in this unit are foothill Woodland and Mixed Chaparral.

The unit makes up approximately 19 percent of the survey area. It is about 40 percent Rock outcrop, 30 percent Cieneba soils, and 15 percent Auberry soils. The remaining 15 percent consists of minor components.

Rock outcrop occurs as small isolated outcroppings and as massive exposures.

Cieneba soils are shallow and somewhat excessively drained. Slopes range from 5 to 75 percent. Typically, the highly weathered granitic rock.

Auberry soils are deep and well drained. Slopes range from 10 to 75 percent. Typically, the surface texture is sandy loam. The underlying material is sandy clay loam and clay loam over highly weathered granitic rock.

Minor components include the shallow Chawanakee and Tollhouse soils, and the deep Bohna soils.

This unit is used as spring-summer livestock range. Forage production is limited by low rainfall and areas of Rock outcrop. It is also limited by the competition from hardwoods and shrubs.

9. Rock outcrop-Chualar family-Livermore family

Rock outcrop and moderately deep, well and moderately well drained soil; on foothills, mountainsides, and ridges.

This map unit occurs on foothills, canyonsides, mountainsides and ridges. The soils formed in residuum from undifferentiated metamorphic, metasedimentary, and basic igneous rock. Elevation ranges from 1,210 to 7,020 feet and the mean annual precipitation ranges from 8 to 30 inches.

The major plant communities in this unit are Mixed Chaparral, Piute Cypress Woodland, Pinyon-Juniper Woodland, and Foothill Woodland.

The unit makes up approximately 5 percent of the survey area. It is about 35 percent Rock outcrop, 30 percent Chualar family soils, and 15 percent Livermore family soils. The remaining 20 percent consists of minor components.

Rock outcrop occurs as small isolated outcroppings and as massive exposures.

Chualar family soils are moderately deep and well drained. Slopes range from 15 to 75 percent. Typically the surface texture is loam. The underlying material is clay loam over weathered basic igneous rock.

Livermore family soils are moderately deep and moderately well drained. Slopes range from 30 to 75 percent. Typically the surface texture is cobbly and stoney sandy loam. The underlying material is very gravelly sandy loam over weathered metasedimentary rock. The soil is 35 to 90 percent rock fragments.

Minor components include shallow and somewhat excessively drained Cieneba and Tollhouse soils.

Minor components include shallow and somewhat excessively drained Cieneba and Tollhouse soils.

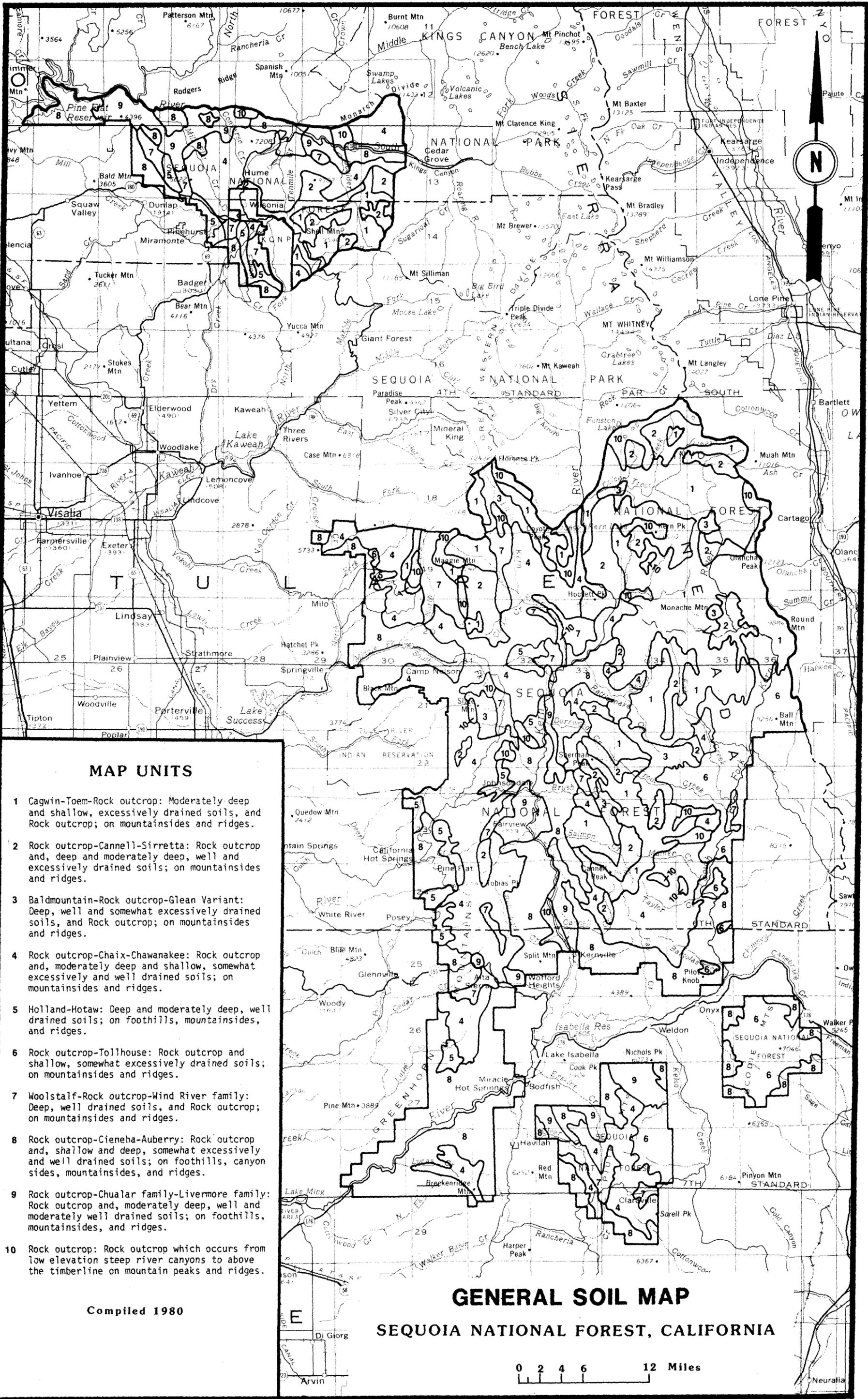
This unit is used as spring-summer livestock range. Forage production is limited by low rainfall and areas of Rock outcrop. It is also limited by the competition from hardwoods and shrubs.

10. Rock outcrop

This map unit occurs from the low elevation steep rivers canyons to above the timberline on mountain peaks and ridges.

This unit makes up approximately 11 percent of the survey area. It is about 85 percent rock outcrop. The remaining 15 percent is made up by shallow soils.

Rock outcrop consists of granitic, basic igneous, undifferentiated metamorphic, metasedimentary and metavolcanic rock types.



MAP UNITS

- 1 Cagwin-Toem-Rock outcrop: Moderately deep and shallow, excessively drained soils, and Rock outcrop; on mountainsides and ridges.
- 2 Rock outcrop-Cannell-Sirretta: Rock outcrop and, deep and moderately deep, well and excessively drained soils; on mountainsides and ridges.
- 3 Baldmountain-Rock outcrop-Glean Variant: Deep, well and somewhat excessively drained soils, and Rock outcrop; on mountainsides and ridges.
- 4 Rock outcrop-Chaix-Chawanakee: Rock outcrop and, moderately deep and shallow, somewhat excessively and well drained soils; on mountainsides and ridges.
- 5 Holland-Hotaw: Deep and moderately deep, well drained soils; on foothills, mountainsides, and ridges.
- 6 Rock outcrop-Tollhouse: Rock outcrop and shallow, somewhat excessively drained soils; on mountainsides and ridges.
- 7 Woolstalf-Rock outcrop-Wind River family: Deep, well drained soils, and Rock outcrop; on mountainsides and ridges.
- 8 Rock outcrop-Cieneha-Auberry: Rock outcrop and, shallow and deep, somewhat excessively and well drained soils; on foothills, canyon sides, mountainsides, and ridges.
- 9 Rock outcrop-Chualar family-Livermore family: Rock outcrop and, moderately deep, well and moderately well drained soils; on foothills, mountainsides, and ridges.
- 10 Rock outcrop: Rock outcrop which occurs from low elevation steep river canyons to above the timberline on mountain peaks and ridges.

Compiled 1980

GENERAL SOIL MAP
SEQUOIA NATIONAL FOREST, CALIFORNIA

0 2 4 6 12 Miles

Detailed Soil Map Units

The map unit symbols on the soils maps are described in this section. The map unit descriptions, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They can also be used to plan the management needed for those areas.

Each map unit on the soil maps represents an area on the landscape and consists of one or more soils for which the unit is named. The symbol from the soil map precedes the map unit name. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are similar make up a soil family, such as Wind River family soil. Except for differences in texture of the surface layer or of the underlying material, all soils of a family have major horizons that are similar in composition, thickness, and arrangement.

Other soils, such as Typic Haploxerolls, have many more differences than soil families. These soils, however, have some similar properties which group them together so that their use can be predicted. These soils were grouped more broad than soil families because they were either highly variable, did not take up much area, or there was too little information known about them. Therefore, the interpretations given for these soils should be taken in a broader sense than soil families.

This survey includes miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example. Miscellaneous areas are described in the map units.

Many map units are made up of two or three soils and/or miscellaneous areas. These map units are called complexes or associations.

A complex consists of two or more soils and/or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Chaix-Dome- Rock outcrop complex, 30 to 50 percent slopes is an example.

An association is made up of two or more geographically associated soils and/or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils are somewhat similar. Shaver-Holland association, moderately steep is an example.

Each map unit includes small scattered areas of soils and miscellaneous areas other than those for which the map unit is named. Some of these soils and miscellaneous areas differ substantially from the major soils and miscellaneous areas. Such differences could significantly affect use and management in the map unit. The included soils and miscellaneous areas are identified in each map unit description.

Definitions and Criteria

Map Units. The map unit symbol corresponds to the same symbol in the delineations on the maps in the back of the report. The map unit name then follows and it includes the name of the soils and miscellaneous area in the map unit, and the slope range of the unit.

Elevation. The range of elevation (in feet) for the map unit.

Annual Precipitation. A range of average annual precipitation (in inches) for the map unit.

Map Unit Components. The name of the dominant soils and miscellaneous area which make up the map unit. Each soil component is described separately under Taxonomic Unit Descriptions.

Approximate Proportion. The approximate proportion of the component in the map unit.

Landscape Position. The name of the landforms on which the component occurs.

Slope. The range of slope for the component.

Native Plant Community. These are the typical plant communities that commonly occur in this map unit.

Soil Profile Description. This is a brief description of the typical, or modal, profile of the soil component. In most instances it is a condensed version of the detailed soil description in the back of the report. This general description combines horizons and includes the thickness, dry color, texture, structure, dry consistence, rock fragment content, and reaction (pH). Miscellaneous areas are also described here.

Surface Layer. The A horizons at or near the surface in which organic matter is mixed with mineral material.

Subsoil. The soil between the surface soil and the uppermost substratum. All parts of B horizons above two meters (80 inches), and any parts of A or

C horizons between the surface soil and one meter (40 inches) or a more shallow substratum, are subsoil.

Substratum. A layer below one meter (40 inches), or beneath the solum if the lower part of the solum is between one and two meters (40 to 80 inches) deep. Any parts of the solum below two meters (80 inches) are substrata. Bedrock, hardpan, and unconsolidated geologic materials that are in contrasting particle-size classes relative to the surface soil or solum are substrata regardless of depth, even within one meter (40 inches) of the ground surface. However, the surface soil and solum together must be at least 10 cm (4 inches) thick for the regolith to be considered soil. A common example of contrasting unconsolidated deposits on alluvial plains is extremely gravelly sand overlain with loam or silt loam. Roots are generally sparse or absent in substrata.

Included Areas. These are areas of soil components or miscellaneous areas that are not identified in the name of the map unit. These areas usually make up a small percentage of the map unit acreage and are not delineated separately because their effect on management is not significantly different, they are too small to be delineated at the scale of mapping, excessive detail of the map would be avoided by including them, or their location cannot be identified practically. Included areas are given because some do effect management significantly and the recognition of all of them will assist with more detailed mapping in the future.

Soil Properties and Management Interpretations

Map Unit Components. These are the soil type(s) and/or miscellaneous area(s) which make up the map unit. Each soil component is then individually interpreted. The interpretations are not applicable on the miscellaneous areas alone, however, the miscellaneous area may have an effect on the rating of the soil component.

Effective Rooting Depth (Inches). The vertical distance, in inches, from the soil surface to bedrock or any other layer that stops or hinders the penetration of roots.

Drainage. This refers to the rate at which water is removed from the soil, the period of wetness, and any possible affect on the growth of plants. It is determined by soil texture, soil structure, rock fragment content, restricting soil layers, depth of bedrock, and height of the water table. The classes recognized in the survey area are:

Excessively Drained - Water is removed from the soil rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat Excessively Drained - Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well Drained - Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately Well Drained - Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat Poorly Drained - Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching stream channels is called ground-water runoff or seepage flow from ground water.

Permeability. The quality of the soil that enables water to move downward through the profile. The rating here is based on the least pervious horizon. The principal factor in controlling the movement of water through the soil is its porosity. Soil porosity is controlled by texture, structure, animal activity, old root channels, and rock fragments. Porosity can be decreased by management activities when these activities cause the soil to compact. Permeability is measured as the number of inches per hour that water moves downward through the

saturated soil. Terms describing the estimated permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 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

Available Water Capacity (Inches). This is the capacity of soils to hold water available for use by most plants. This capacity primarily depends on the soil texture, depth, and rock fragment content. Generally, the more clay which is in the soil the more water it can hold. Conversely, the more rock fragments in the soil the less water is held. Available Water Capacity (AWC) is an important factor in the prediction of conifer seedling survival. It is not the only factor and it is not an estimate of the quantity of water actually available to plants at any given time. AWC is expressed as inches of water in a specified number of inches of soil. This guide (10) is based on soil texture. This amount was reduced if rock fragments were present (3). Two depths are estimated:

Upper 20 Inches. AWC is estimated for the top 20 inches of soil as a guide to evaluating the revegetation potential of the soil for planted conifer seedling stock. As a guide, these class limits may be used to categorize the AWC estimate:

Low	Less than 1.2 inches
Medium	1.2 to 2.4 inches
High	More than 2.4 inches

Total. This is the AWC calculated for the whole soil to a maximum depth of 60 inches. The class limits given to this AWC estimate are:

Low	Less than 3.6 inches
Medium	3.6 to 7.2 inches
High	Over 7.2 inches

Hydrologic Soil Group. The Hydrologic Soil Group (HSG) rates the soils according to their ability to accept and transmit water down through the profile. The HSG may be used in conjunction with other factors such as slope and vegetation to estimate the potential surface runoff. The factors used in the rating are infiltration, permeability, and depth at which permeability reduction begins. The methodology of rating the soils was developed by the Soil Conservation Service, USDA. Hydrologists are the most common user of the Hydrologic Soil Group. The four groups are:

Group A - Soils having high infiltration rates even when thoroughly wetted, consisting chiefly of deep, well to excessively drained sands and/or gravel. These soils have a high rate of water transmission and normally result in a low runoff potential.

Group B - Soils having moderate infiltration rates when thoroughly wetted, consisting chiefly of moderately deep to deep, moderately well to well drained soils, with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C - Soils having slow infiltration rates when thoroughly wetted, consisting chiefly of (1) soils with a layer that impedes the downward movement of water, or (2) soils with moderately fine to fine textures and a slow infiltration rate. These soils have a slow rate of water transmission.

Group D - Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission and usually a high runoff potential.

Unified Soil Classification. Unified soil classification is determined according to the Unified soil classification system. This system classifies soil according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. **Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt.** The classification is based on the soil profile description in the map unit. Soils exhibiting engineering properties of two groups can have a dual classification, for example SW-SM. If the classification changes in the soil profile, such as the surface layer is SM and the subsoil is SC, this would be indicated by a “/”, for example SM/SC.

Erosion Factor K. This is one of six factors used by soil scientists in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Factor K is an indicator of the susceptibility of a soil to erode, but should only be used in the USLE equation. The estimates are based primarily on the percentage of silt, sand and organic matter, the soil structure, and permeability of the soil layer being estimated. These estimates were arrived at by using a nomograph (11) and the actual number of a known similar soil.

Maximum Erosion Hazard

Many land use activities have the potential to cause erosion rates to exceed natural soil erosion or soil formation rates. Potential consequences of accelerated erosion include reductions in the productive capacity of the soil and adverse effects on water quality. Many interrelated factors are evaluated in an EHR system to determine whether land use activities would cause accelerated erosion, and to what degree accelerated erosion would cause adverse effects. It is designed to appraise the relative risk of accelerated sheet and rill erosion. The system does not rate gully erosion, dry ravel, wind erosion, or mass wasting.

The adjective erosion hazard ratings are described below in terms of the likelihood and consequences of accelerated erosion. As the risk of accelerated erosion increases, so does the likelihood that accelerated erosion will exceed soil formation rates. The risk and consequence becomes especially critical for shallow and moderately deep soils over consolidated materials.

The maximum EHR are based on little or no vegetative cover present and on the long-term average occurrence of 2-year, 6-hour storm events. Erosion hazard risks are greater when storm frequency, intensity and/or duration exceed long-term average occurrence, and risks are less when occurrence is below "average". The risks and consequences for adjective erosion hazard ratings are described below.

Low EHR. Accelerated erosion is not likely to occur, except in the upper part of the Low EHR numerical range, or during periods of above average storm occurrence. If accelerated erosion does occur, adverse effects on soil productivity and to nearby water quality are not expected. Erosion control measures are usually not needed for these areas.

Moderate EHR. Accelerated erosion is likely to occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality may occur for the upper part of the Moderate EHR numerical range, or during periods of above average storm occurrence. The need for erosion control should be evaluated for these areas. A wide selection of measures and application methods are available.

High EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality are likely to occur, especially during periods of above average storm occurrence. Erosion control is necessary for these areas to prevent accelerated erosion. The

selection of measures and methods of application are somewhat limited.

Very high EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity and to nearby water quality are very likely to occur, even during periods of below average storm occurrence. Erosion control is essential for these areas to prevent accelerated erosion. The selection of measures and methods of application are limited.

Soil Manageability. Certain features of the land affect the relative ease of management with mechanized equipment. Soil manageability classification rates soils on the basis of their topography and other features that reduce the ease of equipment operation and increase the need for soil protection measures.

Soil Manageability Classes. *Soil manageability classes are ratings that are applied to the individual components of a map unit.* If a soil component is in complex or association with Rock outcrop, however, the class rating for that soil is based on the amount of Rock outcrop in the map unit. Manageability classes are useful for supplying specific information about individual soils. Letter symbols are used to indicate the type and severity of potential problems in soil management. Major limitations to land management are identified by capital letters, and moderate limitations are indicated by lower-case letters. The criteria and symbols for each limiting feature are listed below except slope. In a soil rating, the limitations are listed in the order shown, except that major limitations take precedence over moderate ones.

There are four soil manageability classes, based on slope and the other limiting features presented above. They are:

Class 1 - *Easy to manage.* Soils in this class have less than 35 percent slope. They have no major limitations and no more than one moderate limitation.

Class 2 - *Readily manageable.* Soils in this class are on slopes of less than 35 percent, but they have at least two moderate limitations or one major limitation.

Class 3 - *Moderately difficult to manage.* Soils in this class are on slopes of 35 to 65 percent. Symbols are added to denote any moderate or major limitations.

Class 4 - *Very difficult to manage.* Soils in this class are on slopes of more than 65 percent. Symbols are added to denote any moderate or major limitations.

TABLE 1. - Soil Features Affecting Management

Soil features	Major modifiers	Moderate modifiers
Slope gradient	G.. Mostly more than 60 percent	g.. Mostly between 30 and 60 percent
Maximum erosion hazard	E.. High or very high	e.. Moderate
Soil depth	D.. Less than 10 inches	d.. 10 to 20 inches
AWC, upper 20 inches	P.. Less than 1.2 inches	p.. 1.2 to 2.4 inches
Wetness	W.. Poorly drained	w.. Somewhat poorly drained
Rock outcrop or surface boulders	X.. More than 15 percent of surface	x.. 3 to 15 percent of surface area

Soil Manageability Groups. *Soil manageability groups are ratings for entire map units* for the ease of management based upon the soil manageability classes of the individual soil components in the map unit. They can be used by land managers who deal with large areas and are not concerned with the ratings for the individual soil components. Soil manageability groups are designated by Roman numerals to distinguish them from soil manageability classes. The groups are:

Group I - Map units in this group are comprised primarily of Class 1 components with less than 30 percent Class 2, and less than 20 percent Class 3 and 4 components.

Group II - Map units in this group are comprised primarily of Class 2 components with less than 40 percent Class 3, and less than 15 percent Class 4 components.

Group III - Map units in this group are comprised primarily of Class 3 components with less than 40 percent Class 4 components.

Group IV - Map units in this group are comprised of at least 40 percent Class 4 components.

Range Production

The suitability for range is indicated by "spring-summer, summer, and unsuitable." A rating of "spring-summer" means that the soils are capable of producing annual grasses for grazing in the spring through early summer. A rating of "summer" means that the soils are capable of producing perennial grasses, sedges, and rushes for grazing in the summer. A rating of "unsuitable" means that the unit is not capable of producing forage.

The "most limiting factors" for use as range are listed for the units suited to spring-summer range and summer range.

If the unit is suited to spring-summer range, "Rock outcrop" indicates the percent of non-productive land and "shallow soils" indicates the percent of soils that are less than 20 inches deep.

If the unit is suitable for summer range, "plant competition" indicates that forage generally has to compete with trees and shrubs for sunlight, water, and soil nutrients; "steep slopes" indicates that the unit has slopes of 30 to 50 percent; "very steep slopes" indicates that

the unit has slopes of more than 50 percent; "Rock outcrop" indicates that the unit is 25 percent Rock outcrop or more; and "shallow soils" indicates that the unit is 25 percent soils that are less than 20 inches deep.

Timber Production

Timber productivity is assessed by listing the estimated culmination of mean annual increment (CMAI) for the major map unit component capable of timber production. The productivity of other components of the unit may be dissimilar. Productivity is not listed for incapable or unsuitable units. The suitability for timber production is indicated by incapable, unsuitable, poorly suited, and suitable. Units listed as incapable for timber production have a biological growth potential of less than 20 cubic feet per acre per year. Suitability is an assessment of the ability of capable lands to be adequately restocked within 5 years after harvest. There is a reasonable assurance that units listed as suitable can be restocked, and that units listed as unsuitable cannot be restocked. It will be difficult, but possible, to assure ad-

equately restocking within 5 years in units listed as poorly suited.

The factor of "regeneration difficulty" indicates that the units has two or more restrictive characteristics or qualities. These are designated by the letter a, b, c, d, e, or r. The letter "a" indicates that one of the major soils in the map unit is less than 20 inches deep, which limits the volume of soil available for root development. The letter "b" indicates that the soil temperatures are cold, which reduces the growing season and retards the growth rate of introduced pine species. The letter "c" indicates that the soil is too hot and dry for timber production. The letter "d" indicates that the available water capacity of the soil is low, which reduces seedling survival and growth. The letter "e" indicates that the soils are more than 20 percent rock fragments, which reduces rooting depth and increases difficulty of planting. The letter "f" indicates that more than 20 percent of the map unit is Chaix or Siskiyou family soils, which have restricted depth and low available water capacity.

105 Auberry sandy loam, 50 to 75 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This deep soil is on mountainsides and canyonsides. It formed in residuum derived from granitic rock. The native plant community is Mixed Chaparral. Elevation is 1,600 to 3,280 feet. The average annual precipitation is about 30 to 40 inches.

Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 27 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

Soil Map Unit
Components

Auberry

Depth

40 to 60+ in

Available Water Capacity

Moderate

Total

5 to 8 in

Upper 20"

3 in

Permeability

Moderately slow

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Rapid

Max Erosion Hazard

High

Erosion Factor (K)

0.20

Unified Soil Class

SM/SC

Soil & Rock Color

Intermediate

Soil Manageability
Class

3G

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop, shallow soils, very steep slopes

Soil Manageability
Group

IV

Included Areas &
Remarks

Included in this unit are small areas of Cieneba soils and Rock outcrop. Included areas make up about 20 percent of the total acreage.

This unit is suitable for use as rangeland in spring and summer.

106 Bohna loam, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This deep soil is on foothills. It formed in residuum derived from granitic rock. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 4,100 to 5,410 feet. The average annual precipitation is about 18 to 20 inches.

Typically, the surface layer is brown loam about 19 inches thick. The subsoil is strong brown sandy clay loam about 24 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Soil Map Unit Components

Bohna Loam

Depth

40 to 60 in

Available Water Capacity

High

Total

7 to 10 in

Upper 20"

3 in

Permeability

Moderately slow

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Medium

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.28

Unified Soil Class

ML-CL/CL

Soil & Rock Color

Intermediate

Soil Manageability Class

2e

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop, shallow soils

Soil Manageability Group

II

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils and Rock outcrop. Included areas make up about 15 percent of the total acreage.

This unit is suitable for use as rangeland in spring and summer.

107 Bohna loam, 30 to 50 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This deep soil is on mountainsides. It formed in residuum derived from granitic rock. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 2,300 to 5,410 feet. The average annual precipitation is about 24 to 39 inches.

Typically, the surface layer is brown loam about 19 inches thick. The subsoil is strong brown sandy clay loam about 24 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Soil Map Unit
Components

Bohna Loam

Depth

40 to 60 in

Available Water Capacity
Total
Upper 20"

Moderate to high
7 to 10 in
3 in

Permeability

Moderately slow

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Medium

Max Erosion Hazard

High

Erosion Factor (K)

0.28

Unified Soil Class

ML-CL/CL

Soil & Rock Color

Intermediate

Soil Manageability
Class

3E

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—
Incapable

Range Production
Seasons of Use
Limiting Factors

Spring and summer
rock outcrop, shallow soils

Soil Manageability
Group

III

Included Areas &
Remarks

Included in this unit are small areas of Cieneba soils and Rock outcrop. Included areas make up about 20 percent of the total acreage.

This unit is used as rangeland in spring and summer.

112 Auberry-Holland* association, 10 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on the sides of foothills and mountains. It is in a transitional area; soil temperature ranges from warm to cool. Slope is 10 to 30 percent. The native plant communities range from Mixed Chaparral and Foothill Woodland to Montane Chaparral and Yellow Pine Forest. Elevation is 3,200 to 5,500 feet. The average annual precipitation is about 24 to 35 inches.

This unit is 60 percent Auberry sandy loam and 20 percent Holland sandy loam.

Soil Map Unit Components

Auberry

Holland*

Depth

40 to 60+ in

60+ in

Available Water Capacity Total Upper 20"

Moderate
5 to 8 in
3 in

Moderate to high
7 to 10 in
3 in

Permeability

Moderately slow

Moderately slow

Hydrologic Soil Group

B

B

Drainage Class

Well drained

Well drained

Runoff

Rapid or medium

Rapid or medium

Max Erosion Hazard

Moderate

High

Erosion Factor (K)

0.20

0.32

Unified Soil Class

SM/SC

SM-SC

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

2e

3E

Timber Production CMAI (cu ft/acre) Suitability Limiting Factors

—
Incapable
regeneration difficulty—c and d, high erosion hazard

50 to 84*
Poorly suited

Range Production Seasons of Use Limiting Factors

Spring and summer
rock outcrop, shallow soils

Soil Manageability Group

III

III

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils and Rock outcrop. Included areas make up about 20 percent of the total acreage.

The Auberry soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Holland soil is cool, deep, and well drained. It formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granite. In some areas the surface layer is loam.

This unit is used mainly as rangeland in spring and summer. It is also used for limited timber production.

* Footnote: Timber production value lower than typical for the Holland series in Sequoia National forest.

114 Auberry-Holland* association, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills and mountainsides. It is in a transitional area; soil temperature ranges from warm to cool. Slope is 50 to 75 percent. The native plant communities range from Mixed Chaparral and Foothill Woodland to Montane Chaparral and Yellow Pine Forest. Elevation is 3,200 to 5,500 feet. The average annual precipitation is about 24 to 54 inches.

This unit is 50 percent Auberry sandy loam and 40 percent Holland sandy loam.

Soil Map Unit Components

Auberry

Holland*

Depth

40 to 60+ in

60+ in

Available Water Capacity Total Upper 20"

Moderate
5 to 8 in
3 in

Moderate
7 to 9 in
3 in

Permeability

Moderately slow

Moderately slow

Hydrologic Soil Group

B

B

Drainage Class

Well drained

Well drained

Runoff

Very rapid

Very rapid

Max Erosion Hazard

High

High

Erosion Factor (K)

0.20

0.32

Unified Soil Class

SM/SC

SM-SC

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

3G

3G

Timber Production CMAI (cu ft/acre) Suitability Limiting Factors

—
Incapable
regeneration difficulty—c and d, very steep slopes, high erosion hazard

50 to 84*
Poorly suited

Range Production Seasons of Use Limiting Factors

Spring and summer
rock outcrop, shallow soils, very steep slopes

Spring and summer

Soil Manageability Group

IV

IV

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils and Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Auberry soil is formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Holland soil is cool, deep, and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

This unit is used mainly as rangeland in spring and summer. It is also used for limited timber production.

* Footnote: Timber production value lower than typical for the Holland series in Sequoia National forest.

116 Kanaka-Millerton families-Rock outcrop association, 30 to 50 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills and mountainsides. Slope is 30 to 50 percent. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 1,610 to 4,000 feet. The average annual precipitation is about 24 to 30 inches.

This unit is 40 percent Kanaka family gravelly sandy loam, 30 percent Millerton family gravelly sandy loam, and 20 percent Rock outcrop.

Soil Map Unit
Components

Kanaka family	Millerton family	Rock outcrop
----------------------	-------------------------	---------------------

Depth

20 to 40 in	8 to 20 in	
-------------	------------	--

Available Water Capacity

Low to very low	Very low	
-----------------	----------	--

Total

1 to 3 in	1 to 2 in	
-----------	-----------	--

Upper 20"

2 in	2 in	
------	------	--

Permeability

Moderately rapid	Moderately rapid	
------------------	------------------	--

Hydrologic Soil Group

C	D	
---	---	--

Drainage Class

Well drained	Well drained	
--------------	--------------	--

Runoff

Rapid	Rapid	
-------	-------	--

Max Erosion Hazard

Moderate	High	
----------	------	--

Erosion Factor (K)

0.32	0.49	
------	------	--

Unified Soil Class

SM	SM/SC	
----	-------	--

Soil & Rock Color

Intermediate	High	
--------------	------	--

Soil Manageability
Class

3ep	3Edp	
-----	------	--

Timber Production

CMAI (cu ft/acre)

—	—	
---	---	--

Suitability

Incapable	Incapable	
-----------	-----------	--

Limiting Factors

Range Production

Seasons of Use

Spring and summer	Spring and summer	
-------------------	-------------------	--

Limiting Factors

rock outcrop, shallow soils, high erosion hazard		
--	--	--

Soil Manageability
Group

II	II	
----	----	--

Included Areas &
Remarks

Included in this unit are small areas of shallow soils. Included areas make up about 10 percent of the total acreage.

The Kanaka family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is pale brown and brown gravelly sandy loam about 9 inches thick. The subsoil is yellowish brown gravelly sandy loam about 9 inches thick. The substratum is light yellowish brown gravelly coarse sandy loam about 8 inches thick over highly weathered granitic rock.

The Millerton family soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is brown and light yellowish brown gravelly sandy loam about 6 inches thick. The subsoil is brown gravelly sandy loam and sandy clay loam about 8 inches thick over granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as rangeland in spring and summer.

119 Rock outcrop-Auberry-Kanaka family association, 30 to 50 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills, canyonsides, and mountainsides. Slope is 30 to 50 percent. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 2,400 to 4,360 feet. The average annual precipitation is about 30 to 39 inches.

This unit is 50 percent Rock outcrop, 35 percent Auberry sandy loam, and 15 percent Kanaka family gravelly sandy loam.

Soil Map Unit
Components

Rock outcrop	Auberry	Kanaka family
---------------------	----------------	----------------------

Depth

60+ in

20 to 40 in

Available Water Capacity
Total
Upper 20"

Moderate
5 to 8 in
3 in

Low to very low
1 to 3 in
2 in

Permeability

Moderately slow

Moderately rapid

Hydrologic Soil Group

B

C

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.20

0.32

Unified Soil Class

SM/SC

SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability
Class

3e

3ep

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—
Incapable

—
Incapable

Range Production
Seasons of Use
Limiting Factors

Spring and summer

Spring and summer

Soil Manageability
Group

III

III

Included Areas &
Remarks

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Auberry soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Kanaka family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is pale brown and brown gravelly sandy loam about 9 inches thick. The subsoil is yellowish brown gravelly sandy loam about 9 inches thick. The substratum is light yellowish brown gravelly coarse sandy loam about 8 inches thick over highly weathered granitic rock.

This unit is used as rangeland in spring and summer.

120 Rock outcrop-Auberry-Kanaka family association, 50 to 75 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills, canyonsides, and mountainsides. Slope is 50 to 75 percent. The native plant communities are mainly Foothill Woodland and Mixed Chaparral. Elevation is 2,400 to 4,430 feet. The average annual precipitation is about 30 to 39 inches.

This unit is 50 percent Rock outcrop, 25 percent Auberry sandy loam, and 25 percent Kanaka family gravelly sandy loam.

Soil Map Unit
Components

Rock outcrop	Auberry	Kanaka family
---------------------	----------------	----------------------

Depth

60+ in

20 to 40 in

Available Water Capacity

Moderate

Low to very low

Total

5 to 8 in

1 to 3 in

Upper 20"

3 in

2 in

Permeability

Moderately slow

Moderately rapid

Hydrologic Soil Group

B

C

Drainage Class

Well drained

Well drained

Runoff

Very rapid

Very rapid

Max Erosion Hazard

High

High

Erosion Factor (K)

0.20

0.32

Unified Soil Class

SM/SC

SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability
Class

3G

3Gp

Timber Production

CMAI (cu ft/acre)

—

—

Suitability

Incapable

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Spring and summer

Limiting Factors

rock outcrop, very steep slopes

Soil Manageability
Group

IV

IV

Included Areas &
Remarks

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Auberry soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Kanaka family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is pale brown and brown gravelly sandy loam about 9 inches thick. The subsoil is yellowish brown and brown gravelly sandy loam about 9 inches thick. The substratum is light yellowish brown gravelly coarse sandy loam about 8 inches thick over highly weathered granitic rock.

This unit is used as rangeland in spring and summer.

122 Kanaka family-Chawanakee Variant-Rock outcrop association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 30 to 50 percent. The native plant communities are Mixed Chaparral and Foothill Woodland. Elevation is 3,490 to 5,000 feet. The average annual precipitation is about 24 to 35 inches.

This unit is 50 percent Kanaka family gravelly sandy loam, 30 percent Chawanakee Variant sandy loam, and 20 percent Rock outcrop.

Soil Map Unit Components

	Kanaka family	Chawanakee variant	Rock Outcrop
--	----------------------	---------------------------	---------------------

Depth

	20 to 40 in	8 to 20 in	
--	-------------	------------	--

Available Water Capacity
Total
Upper 20"

	Low to very low 1 to 3 in 2 in	Low to very low 2 to 3 in 3 in	
--	--------------------------------------	--------------------------------------	--

Permeability

	Moderately rapid	Moderate	
--	------------------	----------	--

Hydrologic Soil Group

	C	D	
--	---	---	--

Drainage Class

	Well drained	Well drained	
--	--------------	--------------	--

Runoff

	Rapid	Rapid	
--	-------	-------	--

Max Erosion Hazard

	Moderate	High	
--	----------	------	--

Erosion Factor (K)

	0.32	0.28	
--	------	------	--

Unified Soil Class

	SM	SM	
--	----	----	--

Soil & Rock Color

	Intermediate	Intermediate	
--	--------------	--------------	--

Soil Manageability Class

	2ep	3Edx	
--	-----	------	--

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

	— Incapable	— Incapable	
--	----------------	----------------	--

Range Production
Seasons of Use
Limiting Factors

	Spring and summer rock outcrop, shallow soils	Spring and summer	
--	--	-------------------	--

Soil Manageability Group

	III	III	
--	-----	-----	--

Included Areas & Remarks

The Kanaka family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is pale brown and brown gravelly sandy loam about 9 inches thick. The subsoil is yellowish brown gravelly sandy loam about 9 inches thick. The substratum is light yellowish brown gravelly coarse sandy loam about 8 inches thick over highly weathered granitic rock.

The Chawanakee Variant soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is yellowish brown and light yellowish brown sandy loam about 7 inches thick. The subsoil is yellowish brown and light yellowish brown sandy loam about 11 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as rangeland in spring and summer.

123 Kanaka family-Chawanakee Variant-Rock outcrop association, 50 to 75 percent slopes.

**Physiographic
Location,
Elevation, and
Precipitation**

This map unit is on mountainsides. Slope is 50 to 75 percent. The native plant communities are Mixed Chaparral and Foothill Woodland. Elevation is 2,400 to 5,000 feet. The average annual precipitation is about 24 to 35 inches.

This unit is 40 percent Kanaka family gravelly sandy loam, 30 percent Chawanakee Variant sandy loam, and 30 percent Rock outcrop.

**Soil Map Unit
Components**

Kanaka family	Chawanakee variant	Rock Outcrop
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Depth

20 to 40 in	8 to 20 in	
-------------	------------	--

**Available Water Capacity
Total
Upper 20"**

Low to very low	Low to very low	
1 to 3 in	2 to 3 in	
2 in	3 in	

Permeability

Moderately rapid	Moderate	
------------------	----------	--

Hydrologic Soil Group

C	D	
---	---	--

Drainage Class

Well drained	Well drained	
--------------	--------------	--

Runoff

Very rapid	Very rapid	
------------	------------	--

Max Erosion Hazard

High	High	
------	------	--

Erosion Factor (K)

0.32	0.28	
------	------	--

Unified Soil Class

SM	SM	
----	----	--

Soil & Rock Color

Intermediate	Intermediate	
--------------	--------------	--

**Soil Manageability
Class**

3Ep	3Ep	
-----	-----	--

Timber Production

CMAI (cu ft/acre)

—	—	
---	---	--

Suitability

Incapable	Incapable	
-----------	-----------	--

Limiting Factors

Range Production

Seasons of Use

Spring and summer	Spring and summer	
rock outcrop, shallow soils, very steep slopes,		

Limiting Factors

**Soil Manageability
Group**

IV	IV	
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**Included Areas &
Remarks**

The Kanaka family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is pale brown and brown gravelly sandy loam about 9 inches thick. The subsoil is yellowish brown gravelly sandy loam about 9 inches thick. The substratum is light yellowish brown gravelly coarse sandy loam about 8 inches thick over highly weathered granitic rock.

The Chawanakee Variant soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is yellowish brown and light yellowish brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 11 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as rangeland in spring and summer.

125 Tollhouse Variant-Shaver Variant-Rock outcrop complex, 30 to 50 percent slopes.

**Physiographic
Location,
Elevation, and
Precipitation**

This map unit is on foothills, mountainsides, and ridges. The native plant communities are Mixed Chaparral and Foothill Woodland. Elevation is 2,400 to 4,400 feet. The average annual precipitation is about 30 to 35 inches.

This unit is 40 percent Tollhouse Variant sandy loam, 20 percent Shaver Variant sandy loam, and 20 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

**Soil Map Unit
Components**

Tollhouse variant	Shaver variant	Rock outcrop
--------------------------	-----------------------	---------------------

Depth

7 to 20 in	20 to 40 in	
------------	-------------	--

**Available Water Capacity
Total
Upper 20"**

Very low 1 to 2 in 2 in	Low 3 to 5 in 2 in	
-------------------------------	--------------------------	--

Permeability

Moderately rapid	Moderately rapid	
------------------	------------------	--

Hydrologic Soil Group

D	C	
---	---	--

Drainage Class

Somewhat excessively drained	Well drained	
------------------------------	--------------	--

Runoff

Rapid	Rapid	
-------	-------	--

Max Erosion Hazard

High	High	
------	------	--

Erosion Factor (K)

0.24	0.32	
------	------	--

Unified Soil Class

SM	SM	
----	----	--

Soil & Rock Color

Intermediate	Intermediate	
--------------	--------------	--

**Soil Manageability
Class**

3Ed	3Ep	
-----	-----	--

**Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors**

— Incapable	— Incapable	
----------------	----------------	--

**Range Production
Seasons of Use
Limiting Factors**

Spring and summer rock outcrop, shallow soils, high erosion hazard	Spring and summer	
---	-------------------	--

**Soil Manageability
Group**

III	III	
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**Included Areas &
Remarks**

Included in this unit are small areas of gullied land, Auberry soils, Cieneba soils, and Tollhouse soils. Included areas make up about 20 percent of the total acreage.

The Tollhouse Variant soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 11 inches thick. The substratum is brown sandy loam about 5 inches thick over highly weathered granitic rock.

The Shaver Variant soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is yellowish brown sandy loam about 15 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as rangeland in spring and summer.

201 Cieneba-Rock outcrop complex, 15 to 50 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills, mountainsides, and ridges. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 2,200 to 6,500 feet. The average annual precipitation is about 18 inches.

This unit is 65 percent Cieneba coarse sandy loam and 25 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit
Components

Cieneba

Rock outcrop

Depth

4 to 20 in

Available Water Capacity
Total
Upper 20"

Low
1 to 2 in
2 in

Permeability

Moderately rapid

Hydrologic Soil Group

C

Drainage Class

Somewhat excessively drained

Runoff

Rapid

Max Erosion Hazard

High

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability
Class

4EPdx

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—
Incapable

Range Production
Seasons of Use
Limiting Factors

Spring and summer
rock outcrop, shallow soils, high erosion hazard

Soil Manageability
Group

IV

Included Areas &
Remarks

Included in this unit are small areas of Tollhouse soils and Chualar family soils. Included areas make up about 10 percent of the total acreage.

The Cieneba soil is shallow and formed in residuum derived from granitic rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as rangeland in spring and summer.

202 Cieneba-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills, mountainsides, and ridges. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 980 to 6,560 feet. The average annual precipitation is about 28 inches.

This unit is 65 percent Cieneba coarse sandy loam and 25 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Cieneba

Rock outcrop

Depth

4 to 20 in

Available Water Capacity

Low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Moderately rapid

Hydrologic Soil Group

C

Drainage Class

Somewhat excessively drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

4GPdx

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop, shallow soils, very steep slopes, very high erosion hazard

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Tollhouse soils and Chualar family soils. Included areas make up about 10 percent of the total acreage.

The Cieneba soil is shallow and formed in residuum derived dominantly from granitic rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as rangeland in spring and summer.

203 Chualar family-Rock outcrop complex, 15 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Mixed Chaparral, Piute Cypress Woodland, and Pinyon-Juniper Woodland. Elevation is 2,800 to 5,810 feet. The average annual precipitation is about 12 to 30 inches.

This unit is 70 percent Chualar family loam and 20 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Chualar family

Rock outcrop

Depth

20 to 40 in

Available Water Capacity

Low to moderate

Total

4 to 6 in

Upper 20"

3 in

Permeability

Moderate

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Rapid

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.32

Unified Soil Class

ML/CL

Soil & Rock Color

Intermediate

Soil Manageability Class

2e

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop, shallow soils

Soil Manageability Group

II

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils and Xerofluvents. Included areas make up about 10 percent of the total acreage.

The Chualar family soil is moderately deep and formed in residuum derived from metamorphic, metasedimentary, or basic igneous rock. Typically, the surface layer is dark brown loam about 9 inches thick. The subsoil is brown and yellowish brown clay loam about 20 inches thick over weathered basic igneous rock. In some areas the surface layer is fine sandy loam, sandy loam, or sandy clay loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of rock.

This unit is used as rangeland in spring and summer.

205 Chualar family-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Mixed Chaparral and Pinyon-Juniper Woodland. Elevation is 1,210 to 6,500 feet. The average annual precipitation is about 10 to 30 inches.

This unit is 50 percent Chualar family loam and 30 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Chualar family

Rock outcrop

Depth

20 to 40 in

Available Water Capacity

Low to moderate

Total

4 to 6 in

Upper 20"

3 in

Permeability

Moderate

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

ML/CL

Soil & Rock Color

Intermediate

Soil Manageability Class

3EX

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop, shallow soils, very steep slopes, very high erosion hazard

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils and Xerofluvents. Included areas make up about 20 percent of the total acreage.

The Chualar family soil is moderately deep and formed in residuum derived from metamorphic, metasedimentary, or basic igneous rock. Typically, the surface layer is dark brown loam about 9 inches thick. The subsoil is brown and yellowish brown clay loam about 20 inches thick over weathered basic igneous rock. In some areas the surface layer is fine sandy loam, sandy loam, or sandy clay loam.

Rock outcrop occurs as isolated outcroppings and massive exposures.

This unit is used as rangeland in spring and summer.

212 Auberry-Cieneba-Rock outcrop complex, 10 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This unit is on foothills, canyonsides, and mountainsides. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 3,610 to 5,580 feet. The average annual precipitation is about 18 to 30 inches.

This unit is 55 percent Auberry sandy loam, 15 percent Cieneba coarse sandy loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Auberry	Cieneba	Rock Outcrop
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- Depth
- Available Water Capacity
 - Total
 - Upper 20"
- Permeability
- Hydrologic Soil Group
- Drainage Class
- Runoff
- Max Erosion Hazard
- Erosion Factor (K)
- Unified Soil Class
- Soil & Rock Color
- Soil Manageability Class
- Timber Production
 - CMAI (cu ft/acre)
 - Suitability
 - Limiting Factors
- Range Production
 - Seasons of Use
 - Limiting Factors
- Soil Manageability Group
- Included Areas & Remarks

Depth	40 to 60+ in	4 to 20 in	
Available Water Capacity	Moderate	Very low	
	5 to 8 in	1 to 2 in	
Upper 20"	3 in	1 in	
Permeability	Moderately slow	Moderately rapid	
Hydrologic Soil Group	B	C	
Drainage Class	Well drained	Somewhat excessively drained	
Runoff	Medium	Rapid	
Max Erosion Hazard	Moderate	Moderate	
Erosion Factor (K)	0.20	0.32	
Unified Soil Class	SM/SC	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2ex	2Pex	
Timber Production	—	—	
CMAI (cu ft/acre)	Incapable	Incapable	
Suitability			
Limiting Factors			
Range Production			
Seasons of Use	Spring and summer	Spring and summer	
Limiting Factors	rock outcrop, shallow soils		
Soil Manageability Group	II	II	

Included in this unit are small areas of Chawanakee soils, Chaix soils, and Wind River family soils. Included areas make up about 15 percent of the total acreage.

The Auberry soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock.

The Cieneba soil is shallow and formed in residuum derived from granitic rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as rangeland in spring and summer.

213 Auberry-Cieneba-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on canyonsides and mountainsides. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 980 to 6,560 feet. The average annual precipitation is about 20 to 35 inches.

This unit is 45 percent Auberry sandy loam, 25 percent Cieneba coarse sandy loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Auberry	Cieneba	Rock Outcrop
--	----------------	----------------	---------------------

Depth
Available Water Capacity
Total
Upper 20"
Permeability
Hydrologic Soil Group
Drainage Class
Runoff
Max Erosion Hazard
Erosion Factor (K)
Unified Soil Class
Soil & Rock Color
Soil Manageability Class
Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors
Range Production
Seasons of Use
Limiting Factors
Soil Manageability Group

Depth	40 to 60+ in	4 to 20 in	
Available Water Capacity	Moderate	Low	
Total	5 to 8 in	1 to 2 in	
Upper 20"	3 in	1 in	
Permeability	Moderately slow	Moderately rapid	
Hydrologic Soil Group	B	C	
Drainage Class	Well drained	Somewhat excessively drained	
Runoff	Rapid	Rapid	
Max Erosion Hazard	Moderate	High	
Erosion Factor (K)	0.20	0.32	
Unified Soil Class	SM/SC	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2e	3Epd	
Timber Production	—	—	
CMAI (cu ft/acre)	—	—	
Suitability	Incapable	Incapable	
Limiting Factors			
Range Production			
Seasons of Use	Spring and summer	Spring and summer	
Limiting Factors	rock outcrop, shallow soils, high erosion hazard		
Soil Manageability Group	III	III	

Included Areas & Remarks

Included in this unit are small areas of Chawanakee soils, Chaix soils, and Wind River family soils. Included areas make up about 15 percent of the total acreage.

The Auberry soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock.

The Cieneba soil is shallow and formed in residuum derived dominantly from granitic rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as limited rangeland in spring and summer.

219 Chesaw-Nanny families association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. Slope is 30 to 50 percent. The native plant communities are open stands of Yellow Pine Forest and Pinyon-Juniper Woodland with an understory of Sagebrush Scrub. Elevation is 7,610 to 9,200 feet. The average annual precipitation is about 14 to 20 inches.

This unit is 65 percent Chesaw family extremely cobbly loamy coarse sand and 25 percent Nanny family stony sandy loam.

Soil Map Unit Components

Chesaw family

Nanny family

Depth

20 to 40 in

40 to 60 in

Available Water Capacity

Very low

Low to moderate

Total

1 to 2 in

4 to 6 in

Upper 20"

1 in

2 in

Permeability

Rapid

Moderately rapid

Hydrologic Soil Group

A

B

Drainage Class

Excessively drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.17

0.29

Unified Soil Class

SM-GM-GP

ML

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

4ePX

3EPX

Timber Production

CMAI (cu ft/acre)

20 to 49

50 to 84

Suitability

Poorly suited

Poorly suited

Limiting Factors

regeneration difficulty—b, d and e

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition, steep slopes

Soil Manageability Group

IV

IV

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Chesaw family soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 60 percent gravel and cobbles. Typically, the surface layer is brown extremely cobbly loamy coarse sand about 16 inches thick. The substratum is brown very stony loamy coarse sand about 14 inches thick over highly weathered granitic rock.

The Nanny family soil is deep and formed in residuum derived from granitic rock. This soil is 35 to 80 percent gravel and cobbles. Typically, the surface layer is very dark grayish brown stony sandy loam about 6 inches thick. The subsoil is brown and pale brown sandy loam and extremely gravelly fine sandy loam about 23 inches thick. The substratum is yellowish brown very gravelly loamy fine sand and loamy fine sand about 46 inches thick over highly weathered granitic rock.

This unit is used mainly as rangeland in summer. It is also used for timber production.

221 Chesaw-Nanny families-Monache association, 2 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on the edges of upland basins and on mountainsides and ridges. Slope is 2 to 30 percent. The native plant communities are open stands of Yellow Pine Forest and Pinyon-Juniper Woodland with an understory of Sagebrush Scrub. Elevation is 7,870 to 8,400 feet. The average annual precipitation is about 14 to 20 inches.

This unit is 55 percent Chesaw family extremely cobbly loamy coarse sand, 30 percent Nanny family stony sandy loam, and 10 percent Monache very fine sandy loam.

Soil Map Unit Components

	Chesaw family	Nanny family	Monache
--	----------------------	---------------------	----------------

Depth

	20 to 40 in	40 to 60 in	40 to 60+ in
--	-------------	-------------	--------------

Available Water Capacity
Total
Upper 20"

	Very low 1 to 2 in 1 in	Low to moderate 4 to 6 in 2 in	Moderate 6 to 8 in 3 in
--	-------------------------------	--------------------------------------	-------------------------------

Permeability

	Rapid	Moderately rapid	Moderate
--	-------	------------------	----------

Hydrologic Soil Group

	A	B	B
--	---	---	---

Drainage Class

	Excessively drained	Well drained	Moderately well drained
--	---------------------	--------------	-------------------------

Runoff

	Rapid	Medium	Slow
--	-------	--------	------

Max Erosion Hazard

	Moderate	Moderate	Moderate
--	----------	----------	----------

Erosion Factor (K)

	0.17	0.29	0.32
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Unified Soil Class

	SM-GM-GP	ML	ML-SM
--	----------	----	-------

Soil & Rock Color

	Intermediate	Intermediate	Intermediate
--	--------------	--------------	--------------

Soil Manageability Class

	4ePX	2epX	2e
--	------	------	----

Timber Production

CMAI (cu ft/acre)

	20 to 49	50 to 84	
--	----------	----------	--

Suitability

	Poorly suited	Poorly suited	Unsuitable
--	---------------	---------------	------------

Limiting Factors

	regeneration difficulty—b, d and e		
--	------------------------------------	--	--

Range Production

Seasons of Use

	Summer	Summer	Summer
--	--------	--------	--------

Limiting Factors

	Plant competition		
--	-------------------	--	--

Soil Manageability Group

	IV	IV	IV
--	----	----	----

Included Areas & Remarks

Included in this are small areas of Rock outcrop. Included areas make up about 5 percent of the total acreage.

The Chesaw family soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 60 percent gravel and cobbles. Typically, the surface layer is brown extremely cobbly loamy coarse sand about 16 inches thick. The substratum is brown very stony loamy coarse sand about 14 inches thick over highly weathered granitic rock.

The Nanny family soil is deep and formed in residuum derived from granitic rock. This soil is 35 to 80 percent gravel and cobbles. Typically, the surface layer is very dark grayish brown stony sandy loam about 6 inches thick. The subsoil is brown and pale brown sandy loam and extremely gravelly fine sandy loam about 23 inches thick. The substratum is yellowish brown loamy fine sand and very gravelly loamy fine sand about 46 inches thick over highly weathered granitic rock.

The Monache soil is deep and formed in alluvium derived dominantly from granite. Typically, the surface layer is grayish brown very fine sandy loam about 23 inches thick. The substratum to a depth of 60 inches or more is brown loam and gravelly sandy loam. It has a few dark brown mottles. In some areas the surface layer is loam or fine sandy loam. The water table fluctuates between depths of 36 and 71 inches.

This unit is used mainly as rangeland in summer. It is also used for timber production.

224 Auberry sandy loam, 10 to 30 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This deep soil is on foothills and mountainsides. It formed in residuum derived from granitic rock. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 3,480 to 4,790 feet. The average annual precipitation is about 24 to 35 inches.

Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

Soil Map Unit
Components

Auberry

Depth

40 to 60+ in

Available Water Capacity
Total
Upper 20"

Moderate
5 to 8 in
3 in

Permeability

Moderately slow

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Rapid

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.20

Unified Soil Class

SM-SC

Soil & Rock Color

Intermediate

Soil Manageability
Class

2e

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—
Incapable

Range Production
Seasons of Use
Limiting Factors

Spring and summer
rock outcrop, shallow soils

Soil Manageability
Group

II

Included Areas &
Remarks

Included in this unit are small areas of Cieneba soils and Rock outcrop. Included areas make up about 10 percent of the total acreage.

This unit is used as rangeland in spring and summer.

225 Auberry sandy loam, 30 to 50 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This deep soil is on foothills and mountainsides. It formed in residuum derived from granitic rock. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 2,950 to 5,000 feet. The average annual precipitation is about 24 to 39 inches.

Typically, the surface layer is brown sandy loam and sandy clay loam about 14 inches thick. The subsoil is brown sandy clay loam and clay loam about 28 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

Soil Map Unit
Components

Auberry

Depth

40 to 60+ in

Available Water Capacity

Moderate

Total

5 to 8 in

Upper 20"

3 in

Permeability

Moderately slow

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Rapid

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.20

Unified Soil Class

SM-SC

Soil & Rock Color

Intermediate

Soil Manageability
Class

2e

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop, shallow soils, steep slopes

Soil Manageability
Group

II

Included Areas &
Remarks

Included in this unit are small areas of Cieneba soil and Rock outcrop. Included areas make up about 15 percent of the total acreage.

This unit is used as limited rangeland in spring and summer.

236 Livermore family-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills and mountainsides. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 3,510 to 7,020 feet. The average annual precipitation is about 8 to 30 inches.

This unit is 60 percent Livermore family stony sandy loam and 30 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Livermore family

Rock outcrop

Depth

20 to 40 in

Available Water Capacity

Low to very low

Total

1 to 3 in

Upper 20"

2 in

Permeability

Moderate

Hydrologic Soil Group

C

Drainage Class

Well drained

Runoff

Rapid

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.20

Unified Soil Class

SC/GC

Soil & Rock Color

Low

Soil Manageability Class

2ep

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop

Soil Manageability Group

II

Included Areas & Remarks

Included in this unit are small areas of Chualar family soils. Included areas make up about 10 percent of the total acreage.

The Livermore family soil is moderately deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark brown stony and cobbly sandy loam about 18 inches thick. The subsoil is strong brown very gravelly sandy loam about 7 inches thick. The substratum is brown very gravelly sandy loam about 4 inches thick over fractured metasedimentary rock. Depth to rock ranges from 20 to 47 inches.

Rock outcrop occurs as isolated outcroppings and massive exposures of metasedimentary rock.

This unit is used as rangeland in spring and summer.

238 Livermore family-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills and mountainsides. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 3,610 to 7,020 feet. The average annual precipitation is about 8 to 30 inches.

This unit is 50 percent Livermore family stony sandy loam and 40 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit
Components

Livermore family

Rock outcrop

Depth

20 to 40 in

Available Water Capacity

Low to very low

Total

1 to 3 in

Upper 20"

2 in

Permeability

Moderate

Hydrologic Soil Group

C

Drainage Class

Well drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.20

Unified Soil Class

SC/GC

Soil & Rock Color

Low

Soil Manageability
Class

2Gp

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

rock outcrop, very steep slopes

Soil Manageability
Group

IV

Included Areas &
Remarks

Included in this unit are small areas of Chualar family soils. Included areas make up about 10 percent of the total acreage.

The Livermore family soil is moderately deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark brown stony and cobbly sandy loam about 18 inches thick. The subsoil is strong brown very gravelly sandy loam about 7 inches thick. The substratum is brown very gravelly sandy loam about 4 inches thick over fractured metasedimentary rock. Depth to rock ranges from 20 to 47 inches.

This unit is used as rangeland in spring and summer.

300 Xerofluvents-Xerorthents-Riverwash association, 0 to 15 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on canyonsides and mountainsides. Slope is 0 to 15 percent. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 3,200 to 5,400 feet. The average annual precipitation is about 12 to 24 inches.

This unit is 35 percent Xerofluvents, 35 percent Xerorthents, and 30 percent Riverwash.

Soil Map Unit
Components

Xerofluvents	Xerorthents	Riverwash
---------------------	--------------------	------------------

Depth

Varies	Varies	
--------	--------	--

Available Water Capacity
Total
Upper 20"

Low	Low	
Varies	Varies	
Varies	Varies	

Permeability

Varies	Varies	
--------	--------	--

Hydrologic Soil Group

A	D	
---	---	--

Drainage Class

Poorly drained or excessively drained	Well drained or somewhat excessively drained	
---------------------------------------	--	--

Runoff

Medium or rapid	Medium or rapid	
-----------------	-----------------	--

Max Erosion Hazard

Moderate	Moderate	
----------	----------	--

Erosion Factor (K)

—	—	
---	---	--

Unified Soil Class

GP/GW	GP/GW	
-------	-------	--

Soil & Rock Color

High	High	
------	------	--

Soil Manageability
Class

4ePX	4ePX	
------	------	--

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—	—	
Incapable	Incapable	

Range Production
Seasons of Use
Limiting Factors

Unsuitable	Unsuitable	
------------	------------	--

Soil Manageability
Group

IV	IV	
----	----	--

Included Areas &
Remarks

Xerofluvents formed in recent alluvium adjacent to the Kern River and its tributaries. These soils are deep and are gravelly, cobbly, and stony sand and sandy loam. They have many boulders and stones on the surface. Xerofluvents are subject to change by stream overflow, erosion, and deposition.

Xerorthents formed in unconsolidated recent colluvium. Texture and content of rock fragments is variable. The soils do not have distinct layers.

Riverwash is immediately adjacent to river channels. It is deep and is gravelly, cobbly, and stony sand, loamy sand, and sandy loam. A water table is at or near the surface. Deposition and removal of soil material are common.

This unit is not suited to timber production or to use as rangeland in summer because of stones and boulders, warm soil temperature, and the high water table. If the unit is used for recreational development, the main limitations are seasonal flooding, changes in the stream channel, boulders on the surface, and deposition.

301 Xerofluvents-Xerorthents association, 5 to 15 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on alluvial fans in the Scodie Mountains. Slope is mainly 5 to 15 percent. The native plant communities are Joshua Tree Woodland and Pinyon-Juniper Woodland. Elevation is 3,000 to 5,590 feet. The average annual precipitation is about 8 to 12 inches.

This unit is 45 percent Xerofluvents and 45 percent Xerorthents.

Soil Map Unit
Components

Xerofluvents

Xerorthents

Depth

Varies

Varies

Available Water Capacity
Total
Upper 20"

Low

Low

Varies

Varies

Varies

Varies

Permeability

Varies

Varies

Hydrologic Soil Group

A

D

Drainage Class

Poorly drained through excessively drained

Well drained or somewhat excessively drained

Runoff

Medium or rapid

Medium or rapid

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

—

—

Unified Soil Class

GP/GW

GP/GW

Soil & Rock Color

High

High

Soil Manageability
Class

4EPX

4EPX

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—

—

Incapable

Incapable

Range Production
Seasons of Use
Limiting Factors

Unsuitable

Unsuitable

Soil Manageability
Group

IV

IV

Included Areas &
Remarks

Included in this unit are small areas of Riverwash. Included areas make up about 10 percent of the total acreage.

Xerofluvents formed in alluvium. They are deep and are gravelly, cobbly, and stony sand and sandy loam. They have many boulders and stones on the surface. Xerofluvents are subject to change by stream overflow, erosion, and deposition.

Xerorthents formed in unconsolidated recent colluvium. Texture and content of rock fragments is variable. Xerorthents do not have distinct layers.

This unit is used as limited rangeland in summer.

302 Wind River family-Monache Variant, drained, warm association, 2 to 15 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is in upland basins and on the edges of upland basins. Slope is 2 to 15 percent. The native plant communities are Montane Meadow, Yellow Pine Forest, and Montane Chaparral. Elevation is 6,000 to 7,790 feet. The average annual precipitation is about 30 to 39 inches.

This unit is 60 percent Wind River family loam and 20 percent Monache Variant, drained, warm soils.

Soil Map Unit
Components

Wind River family

Monache variant

Depth

40 to 60+ in

40 to 60+ in

Available Water Capacity

Low to moderate

Moderate

Total

4 to 6 in

7 to 9 in

Upper 20"

3 in

3 in

Permeability

Moderate

Moderate or slow

Hydrologic Soil Group

B

C

Drainage Class

Well drained or moderately well drained

Somewhat poorly drained

Runoff

Medium

Slow

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.20

0.20

Unified Soil Class

ML/SC

ML

Soil & Rock Color

Low

Low

Soil Manageability
Class

2e

2ew

Timber Production

CMAI (cu ft/acre)

85 to 119

—

Suitability

Suitable

Unsuitable

Limiting Factors

No prominent limitations

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition

Soil Manageability
Group

II

II

Included Areas &
Remarks

Included in this unit are small areas of Holland and Dome soils and Rock outcrop. Included areas make up about 20 percent of the total acreage.

The Wind River family soil is deep and formed in residuum derived from metamorphic, metasedimentary, or granitic rock. Typically, the surface layer is brown loam about 12 inches thick. The subsoil is brown and strong brown loam and gravelly loam about 21 inches thick. The substratum is pinkish gray very gravelly sandy loam about 10 inches thick over fractured metasedimentary rock.

The Monache Variant soil is deep and formed in mixed alluvium derived from granitic and metamorphic rock. Typically, the surface layer is gray and dark grayish brown loam, sandy loam, and silt loam about 23 inches thick. The substratum to a depth of 53 inches or more is stratified, grayish brown and brown sandy loam and silt loam. It has yellowish brown mottles.

The water table fluctuates between depths of 24 and 71 inches. It has been lowered as a result of stream entrenchment.

This unit is used mainly as rangeland in summer. It is also used for timber production.

303 Monache Variant, drained-Monache association, 0 to 5 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is in upland basins and on the edges of upland basins. Slope is 0 to 5 percent. The native plant communities are Montane Meadow, Lodgepole Pine Forest, and Sagebrush Scrub. Elevation is 6,500 to 9,000 feet. The average annual precipitation is about 18 to 51 inches.

This unit is 45 percent Monache Variant, drained soils and 40 percent Monache very fine sandy loam.

Soil Map Unit Components

Monache variant

Monache

Depth

40 to 60+ in

40 to 60+ in

Available Water Capacity
Total
Upper 20"

High
8 to 10 in
3 in

Moderate
6 to 8 in
2 in

Permeability

Moderate or slow

Moderate

Hydrologic Soil Group

D

B

Drainage Class

Somewhat poorly

Moderately drained, well drained

Runoff

Slow

Slow

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.37

0.32

Unified Soil Class

ML/CL

ML/SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

2ew

2ew

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—
Incapable

—
Incapable

Range Production
Seasons of Use
Limiting Factors

Summer

Summer

Soil Manageability Group

II

II

Included Areas & Remarks

Included in this unit are small areas of Cagwin, Toem, Cannell, and Cagwin Variant soils. Included areas make up about 15 percent of the total acreage.

The Monache Variant soil is deep and formed in mixed alluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown loam and very fine sandy loam about 22 inches thick. The substratum to a depth of 43 inches or more is dark brown and very dark grayish brown, stratified loamy sand and silt loam. It has yellowish brown mottles.

Effective rooting depth is 39 to 59 inches or more. The water table fluctuates between depths of 24 and 71 inches. It has been lowered as a result of stream entrenchment.

The Monache soil is deep and formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown very fine sandy loam about 23 inches thick. The substratum to a depth of 60 inches or more is brown loam and gravelly sandy loam. It has dark brown mottles. In some areas the surface layer is loam or fine sandy loam.

The water table fluctuates between depths of 36 and 71 inches.

This unit is used as rangeland in summer.

306 Monache Variant, drained, warm-Junipero family association, 0 to 5 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is in upland basins. Slope is 0 to 5 percent. The native plant community is Montane Meadow. Elevation is 4,690 to 7,610 feet. The average annual precipitation is about 16 to 39 inches.

This unit is 65 percent Monache Variant, drained, warm soils and 25 percent Junipero family loam.

Soil Map Unit
Components

Monache variant

Junipero family

Depth

40 to 60+ in

40 to 60+ in

Available Water Capacity
Total
Upper 20"

Moderate
7 to 9 in
3 in

Moderate
6 to 8 in
2 in

Permeability

Moderate or slow

Moderate

Hydrologic Soil Group

C

B

Drainage Class

Somewhat poorly drained

Moderately well drained

Runoff

Slow

Medium

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.20

0.24

Unified Soil Class

ML

SC-SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability
Class

2ew

2ep

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—
Incapable

—
Incapable

Range Production
Seasons of Use
Limiting Factors

Summer

Summer

Soil Manageability
Group

II

II

Included Areas &
Remarks

Included in this unit are small areas of Dome and Chaix soils. Included areas make up about 10 percent of the total acreage.

The Monache Variant soil is deep and formed in mixed alluvium derived dominantly from granitic and metamorphic rock. Typically, the surface layer is dark grayish brown and gray loam, sandy loam, and silt loam about 23 inches thick. The substratum to a depth of 53 inches or more is stratified, grayish brown and brown sandy loam and silt loam. It has yellowish brown mottles.

The water table fluctuates between depths of 24 and 71 inches. It has been lowered as a result of stream entrenchment.

The Junipero family soil is deep formed in mixed alluvium derived dominantly from granitic and metamorphic rock. Typically, the surface layer is grayish brown loam about 12 inches thick. The subsoil is grayish brown sandy loam about 18 inches thick. The substratum to a depth of 60 inches or more is light brownish gray sandy loam and loamy sand. It has yellowish brown mottles.

The water table fluctuates between depths of 30 to 63 inches.

This unit is used as rangeland in summer.

309 Monache-Typic Haploxerolls-Cagwin Variant association, 0 to 15 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on the edge of upland basins and on mountainsides. Slope is 0 to 15 percent. The native plant communities are Montane Meadow, Lodgepole Pine Forest, and Sagebrush Scrub. Elevation is 6,560 to 8,010 feet. The average annual precipitation is about 14 to 45 inches.

This unit is 60 percent Monache very fine sandy loam, 20 percent Typic Haploxerolls, and 15 percent Cagwin Variant loamy coarse sand.

Soil Map Unit
Components

Monache	Typic Haploxerolls	Cagwin variant
---------	--------------------	----------------

Depth

40 to 60+ in	40 to 60+ in	60+ in
--------------	--------------	--------

Available Water Capacity
Total
Upper 20"

Moderate 6 to 8 in 1 in	Low 3 to 4 in 3 in	Low to very low 2 to 3 in 1 in
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Permeability

Moderate	Moderately rapid	Rapid
----------	------------------	-------

Hydrologic Soil Group

B	B	A
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Drainage Class

Moderately well drained	Moderately well drained	Excessively drained
-------------------------	-------------------------	---------------------

Runoff

Slow	Medium	Very slow
------	--------	-----------

Max Erosion Hazard

Moderate	Moderate	Moderate
----------	----------	----------

Erosion Factor (K)

0.32	0.28	0.24
------	------	------

Unified Soil Class

ML/SM	SM/GM	SM
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Soil & Rock Color

Intermediate	Intermediate	Intermediate
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Soil Manageability Class

2ep	2e	2ep
-----	----	-----

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

— Incapable	— Incapable	20 to 49 poorly suited
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Range Production
Seasons of Use
Limiting Factors

Summer Plant competition	Summer	Summer
-----------------------------	--------	--------

Soil Manageability Group

II	II	II
----	----	----

Included Areas &
Remarks

Included in this unit are small areas of Chesaw family soils and Nanny family soils. Included areas make up about 5 percent of the total acreage.

The Monache soil is deep and formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown very fine sandy loam about 23 inches thick. The substratum to a depth of 60 inches or more is brown loam and gravelly sandy loam. It has dark brown mottles. In some areas the surface layer is loam or fine sandy loam.

The water table fluctuates between depths of 36 and 71 inches.

The Typic Haploxerolls are moderately deep and formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is brown fine sandy loam about 14 inches thick. The subsoil is pale brown fine sandy loam about 11 inches thick. The substratum to a depth of 39 inches or more is multicolored, mottled very gravelly coarse sand or gravelly loamy sand. In some areas the surface layer is loam or very fine sandy loam.

The water table fluctuates between depths of 59 and 99 inches.

The Cagwin Variant soil is deep and formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is dark yellowish brown loamy coarse sand about 4 inches thick. The substratum to a depth of 39 inches or more is light brownish gray and pale brown gravelly loamy coarse sand. In some areas the surface layer is loamy sand.

This unit is used as rangeland in summer.

310 Cagwin Variant loamy coarse sand, 5 to 15 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This deep soil is on toe slopes and alluvial fans adjacent to upland basins. It formed in alluvium derived dominantly from granitic rock. The native vegetation is mainly widely scattered Montane forbs or lodgepole pine. Elevation is 8,010 to 8,530 feet. The average annual precipitation is about 18 to 24 inches.

Typically, the surface layer is dark yellowish brown loamy coarse sand about 4 inches thick. The substratum to a depth of 39 inches or more is light brownish gray and pale brown gravelly loamy coarse sand.

Soil Map Unit
Components

Cagwin variant

Depth

60+ in

Available Water Capacity

Low to very low

Total

2 to 3 in

Upper 20"

1 in

Permeability

Rapid

Hydrologic Soil Group

A

Drainage Class

Excessively drained

Runoff

Medium

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.24

Unified Soil Class

SM

Soil & Rock Color

Intermediate

Soil Manageability
Class

3eP

Timber Production

CMAI (cu ft/acre)

20 to 49

Suitability

Poorly suited

Limiting Factors

Regeneration difficulty—b and d

Range Production

Seasons of Use

Unsuitable

Limiting Factors

Soil Manageability
Group

III

Included Areas &
Remarks

Included in this unit are small areas of Monache Variant soils, drained, Nanny family soils, and Chesaw family soils. Included areas make up about 10 percent of the total acreage.

This unit is used as wildlife habitat because of the widely scattered vegetation.

311 Cannell-Nanny family-Monache Variant association, 5 to 30 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on mountainsides and ridges and in upland basins. Slope is 5 to 30 percent. The native plant communities are Red Fir Forest, White Fir Forest, Lodgepole Pine Forest, and Montane Meadow communities. Elevation is 7,220 to 8,530 feet. The average annual precipitation is about 20 to 30 inches.

This unit is 35 percent Cannell sandy loam, 25 percent Nanny family stony sandy loam, and 25 percent Monache Variant silt loam. The Monache Variant soil is in upland basins.

Soil Map Unit
Components

	Cannell	Nanny family	Monache variant
Depth	40 to 60 in	40 to 60+ in	40 to 60+ in
Available Water Capacity	Moderate	Low to moderate	Moderate
Total	5 to 7 in	4 to 6 in	6 to 8 in
Upper 20"	2 in	2 in	3 in
Permeability	Moderately rapid	Moderately rapid	Slow
Hydrologic Soil Group	B	B	D
Drainage Class	Well drained	Well drained	Poorly drained
Runoff	Medium	Medium	Medium
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (K)	0.24	0.29	0.37
Unified Soil Class	SM	ML	ML/CL
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	2ep	3px	3eW
Timber Production			
CMAI (cu ft/acre)	85 to 119	50 to 84	—
Suitability	Suitable	Suitable	Unsuitable
Limiting Factors	Regeneration difficulty—b and e		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	II
Included Areas & Remarks	Included in this unit are small areas of Rock outcrop. Included areas make up about 15 percent of the total acreage.		
	The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.		
	The Nanny family soil is deep and formed in residuum derived from granitic rock. This soil is 35 to 80 percent gravel and cobbles. Typically, the surface layer is very dark grayish brown stony sandy loam about 6 inches thick. The subsoil is brown and pale brown sandy loam and extremely gravelly fine sandy loam about 23 inches thick. The substratum is yellowish brown loamy sand and very gravelly loamy fine sand about 46 inches thick over highly weathered granitic rock.		
	The Monache Variant soil is deep and formed in alluvium derived dominantly from granitic rock. Typically, the surface is covered with a dense mat of sedge roots 10 inches thick. The soil is black and very dark gray, stratified silt loam and silty clay loam. Reddish brown mottles are below a depth of 20 inches to a depth of 59 inches or more.		
	The water table fluctuates between the surface and a depth of 10 inches.		
	This unit is mainly used as timber production. It is also used as rangeland in summer.		

Depth

Available Water Capacity

Total

Upper 20"

Permeability

Hydrologic Soil Group

Drainage Class

Runoff

Max Erosion Hazard

Erosion Factor (K)

Unified Soil Class

Soil & Rock Color

Soil Manageability Class

Timber Production

CMAI (cu ft/acre)

Suitability

Limiting Factors

Range Production

Seasons of Use

Limiting Factors

Soil Manageability Group

Included Areas &
Remarks

400 Rock outcrop.

Physiographic
Location,
Elevation, and
Precipitation

Soil Map Unit
Components

Depth

Available Water Capacity
Total
Upper 20"

Permeability

Hydrologic Soil Group

Drainage Class

Runoff

Max Erosion Hazard

Erosion Factor (K)

Unified Soil Class

Soil & Rock Color

Soil Manageability
Class

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

Range Production
Seasons of Use
Limiting Factors

Soil Manageability
Group

Included Areas &
Remarks

This map unit consists of exposed areas of granitic, basic igneous, metamorphic, metasedimentary, and metavolcanic rock. These areas support little if any vegetation.

Rock outcrop

Included in this unit are small areas of shallow soils.

This unit is not suited to timber production, to use as rangeland in summer, or to recreational development. Some areas are used for mining.

This map unit is in soil manageability group IV.GDX.

404 Rock outcrop-Xerorthents association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on canyonsides, mountaintops, and ridges. Slope is 30 to 50 percent. The native plant community is Montane Chaparral. Elevation is 6,000 to 9,300 feet. The average annual precipitation is about 16 to 35 inches.

This unit is 65 percent Rock outcrop and 35 percent Xerorthents.

Soil Map Unit Components

Rock outcrop

Xerorthents

Depth

Varies

Available Water Capacity

Low

Total

Varies

Upper 20"

Varies

Permeability

Varies

Hydrologic Soil Group

D

Drainage Class

Well drained or somewhat excessively drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

—

Unified Soil Class

GP-GW

Soil & Rock Color

High

Soil Manageability Class

4EPX

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Unsuitable

Limiting Factors

Soil Manageability Group

IV

Included Areas & Remarks

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic, metamorphic, and basic igneous rock.

Xerorthents formed in unconsolidated recent colluvium. Texture and the content of rock fragments are variable. Xerorthents do not have distinct soil layers.

This unit is used as habitat for wildlife. It is not suited to most other uses because of the potential instability of the Xerorthents and the areas of Rock outcrop.

409 Rock outcrop-Toem-Sirretta complex, 10 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest and Foxtail Limber Pine Forest. Elevation is 7,200 to 9,600 feet. The average annual precipitation is about 20 to 51 inches.

This unit is 40 percent Rock outcrop, 25 percent Toem loamy sand, and 15 percent Sirretta gravelly coarse sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Depth
Available Water Capacity
 Total
 Upper 20"
Permeability
Hydrologic Soil Group
Drainage Class
Runoff
Max Erosion Hazard
Erosion Factor (K)
Unified Soil Class
Soil & Rock Color
Soil Manageability Class
Timber Production
 CMAI (cu ft/acre)
 Suitability
 Limiting Factors
Range Production
 Seasons of Use
 Limiting Factors
Soil Manageability Group
Included Areas & Remarks

Rock outcrop	Toem	Sirretta
	4 to 20 in	20 to 40 in
	Very low	Low to very low
	1 to 2 in	1 to 2 in
	2 in	1 in
	Rapid	Rapid
	D	A
	Excessively drained	Excessively drained
	Rapid	Rapid
	Moderate	Moderate
	0.32	0.17
	SM	GM/SW
	Intermediate	Intermediate
	2epd	4ePX
	20 to 49	20 to 49
	Poorly suited	Poorly suited
Regeneration difficulty—a, b, d, and e		
	Summer	Summer
Plant competition, rock outcrop, shallow soils		
	IV	IV

Included in this unit are small areas of Cagwin soils, Cannell soils, and Nanny family soils. Included areas make up about 20 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

The Sirretta soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark grayish brown gravelly coarse sandy loam about 6 inches thick. The substratum is brown and light yellowish brown extremely cobbly loamy sand about 22 inches thick over fractured granitic rock.

This unit is used mainly as limited rangeland in summer. It is also used for some timber production.

410 Rock outcrop-Toem complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant community is Montane Chaparral. Elevation is 6,400 to 9,600 feet. The average annual precipitation is about 20 to 51 inches.

This unit is 60 percent Rock outcrop and 30 percent Toem soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Toem

Depth

4 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Rapid

Hydrologic Soil Group

D

Drainage Class

Excessively drained

Runoff

Very rapid

Max Erosion Hazard

High

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

3EXp

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Unsuitable

Limiting Factors

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Cagwin soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

This unit is used as limited rangeland in summer.

411 Rock outcrop-Toem complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant community is Montane Chaparral. Elevation is 7,090 to 9,200 feet. The average annual precipitation is about 20 to 51 inches.

This unit is 60 percent Rock outcrop and 30 percent Toem soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Toem

Depth

4 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Rapid

Hydrologic Soil Group

D

Drainage Class

Excessively drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

4GPX

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Unsuitable

Limiting Factors

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Cagwin soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 8 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

This unit is used as limited rangeland in summer.

414 Rock outcrop-Chualar family complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Mixed Chaparral and Pinyon-Juniper Woodland. Elevation is 2,400 to 6,400 feet. The average annual precipitation is 10 to 30 inches.

This unit is 60 percent Rock outcrop and 30 percent Chualar family loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Chualar family

Depth

20 to 40 in

Available Water Capacity

Low to moderate

Total

4 to 6 in

Upper 20"

3 in

Permeability

Moderate

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

ML/CL

Soil & Rock Color

Intermediate

Soil Manageability Class

4GX

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

Rock outcrop, shallow soils, very steep slopes, very high erosion hazard

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of metamorphic, metasedimentary, and basic igneous rocks.

The Chualar family soil is moderately deep and formed in residuum derived from metamorphic, metasedimentary, and basic igneous rocks. Typically, the surface layer is dark brown loam about 9 inches thick. The subsoil is brown and yellowish brown clay loam about 20 inches thick over weathered basic igneous rock. In some areas the surface layer is sandy loam, fine sandy loam, or sandy clay loam.

This unit is used mainly as rangeland in spring and summer. It is also used for mining.

419 Rock outcrop-Cieneba complex, 30 to 50 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills, mountainsides, and ridges. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 2,800 to 6,560 feet. The average annual precipitation is about 18 inches.

This unit is 65 percent Rock outcrop and 25 percent Cieneba coarse sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit
Components

Rock outcrop

Cieneba

Depth

4 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

1 in

Permeability

Moderately rapid

Hydrologic Soil Group

C

Drainage Class

Somewhat excessively drained

Runoff

Rapid

Max Erosion Hazard

High

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability
Class

4EPXd

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

Rock outcrop, shallow soils, high erosion hazard

Soil Manageability
Group

IV

Included Areas &
Remarks

Included in this unit are small areas of Chualar family soils and Tollhouse family soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Cieneba soil is shallow and formed in residuum derived from granite rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used as rangeland in spring and summer.

420 Rock outcrop-Cieneba complex, 50 to 75 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills, mountainsides, and ridges. The native plant communities are Foothill Woodland and Mixed Chaparral. Elevation is 1,810 to 7,710 feet. The average annual precipitation is about 20 to 35 inches.

This unit is 75 percent Rock outcrop and 20 percent Cieneba coarse sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit
Components

Rock outcrop

Cieneba

Depth

4 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

1 in

Permeability

Moderately rapid

Hydrologic Soil Group

C

Drainage Class

Somewhat excessively drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability
Class

4EPXd

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Spring and summer

Limiting Factors

Rock outcrop, shallow soils, very steep slopes, very high erosion hazard

Soil Manageability
Group

IV

Included Areas &
Remarks

Included in this unit are small areas of Chualar family soils. Included areas make up about 5 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Cieneba soil is shallow and formed in residuum derived from granitic rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used as limited rangeland in spring and summer.

421 Rock outcrop-Tollhouse complex, 15 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Pinyon-Juniper Woodland and Sagebrush Scrub. Elevation is 5,000 to 8,200 feet. The average annual precipitation is about 12 to 24 inches.

This unit is 60 percent Rock outcrop and 25 percent Tollhouse soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Tollhouse

Depth

8 to 20 in

Available Water Capacity Total Upper 20"

Very low
1 to 2 in
2 in

Permeability

Moderately rapid

Hydrologic Soil Group

D

Drainage Class

Somewhat excessively drained

Runoff

Rapid

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

2ep

Timber Production

—

CMAI (cu ft/acre)

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Summer

Limiting Factors

Rock outcrop, shallow soils, plant competition

Soil Manageability Group

II

Included Areas & Remarks

Included in this unit are small areas of Chaix and Cieneba soils. Included areas make up about 15 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic or metamorphic rock.

The Tollhouse soil is shallow and formed in residuum derived dominantly from granitic or metamorphic rock. Typically, the soil is brown coarse sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

This unit is used as limited rangeland in summer.

422 Rock outcrop-Tollhouse complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Pinyon-Juniper Woodland and Sagebrush Scrub. Elevation is 4,790 to 8,400 feet. The average annual precipitation is about 12 to 24 inches.

This unit is 65 percent Rock outcrop and 20 percent Tollhouse soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Tollhouse

Depth

8 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Moderately rapid

Hydrologic Soil Group

D

Drainage Class

Somewhat excessively drained

Runoff

Rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

4EPX

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Summer

Limiting Factors

Rock outcrop, shallow soils, plant competition, steep slopes, very high erosion hazard

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Chaix and Cieneba soils. Included areas make up about 15 percent of the total acreage.

Rock outcrop occurs mainly as isolated outcroppings and massive exposures of granitic or metasedimentary rock.

The Tollhouse soil is shallow and formed in residuum derived dominantly from granitic or metamorphic rock. Typically, the soil is brown coarse sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

This unit is used as limited rangeland in summer.

423 Rock outcrop-Tollhouse complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Pinyon-Juniper Woodland and Sagebrush Scrub. Elevation is 4,400 to 8,790 feet. The average annual precipitation is about 12 to 24 inches.

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

Soil Map Unit Components

Rock outcrop

Tollhouse

Depth

8 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Moderately rapid

Hydrologic Soil Group

D

Drainage Class

Somewhat excessively drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

4GPX

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Summer

Limiting Factors

Rock outcrop, shallow soils, very steep slopes, plant competition very high erosion hazard

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs mainly as isolated outcroppings and massive exposures of granitic or metamorphic rock.

The Tollhouse soil is shallow and formed in residuum derived dominantly from granitic or metamorphic rock. Typically, the soil is brown coarse sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

This unit is used as habitat for wildlife.

429 Rock outcrop-Cieneba-Chawanakee complex, 30 to 75 percent slopes.

**Physiographic
Location,
Elevation, and
Precipitation**

This map unit is on foothills, mountainsides, and ridges. It is in a transitional area; soil temperature ranges from warm to cool. The native plant communities are Montane Chaparral, Mixed Chaparral, and Foothill Woodland. Elevation is 6,230 to 6,890 feet. The average annual precipitation is about 26 to 35 inches.

This unit is 70 percent Rock outcrop, 10 percent Cieneba soils, and 10 percent Chawanakee soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

**Soil Map Unit
Components**

Rock outcrop

Cieneba

Chawanakee

Depth

4 to 20 in

8 to 20 in

Available Water Capacity

Very low

Very low

Total

1 to 2 in

1 to 2 in

Upper 20"

1 in

1 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

C

C

Drainage Class

Somewhat excessively drained

Somewhat excessively drained

Runoff

Very rapid

Very rapid

Max Erosion Hazard

Very high

Very high

Erosion Factor (K)

0.32

0.28

Unified Soil Class

SM

SM

Soil & Rock Color

High

High

**Soil Manageability
Class**

3Ep

4EDX

Timber Production

CMAI (cu ft/acre)

—

20 to 49

Suitability

Incapable

Poorly suited

Limiting Factors

Range Production

Seasons of Use

Spring and
summer

Spring and
summer

Limiting Factors

Rock outcrop, shallow soils, very steep slopes, very high erosion hazard

**Soil Manageability
Group**

IV

IV

**Included Areas &
Remarks**

Included in this unit are small areas of Chaix and Tollhouse soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Cieneba soil is shallow and formed in residuum derived from granitic rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used as limited rangeland in spring and summer.

430 Rock outcrop-Chawanakee-Chaix complex, 15 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Montane Chaparral, Yellow Pine Forest, and White Fir Forest. Elevation is 6,400 to 8,040 feet. The average annual precipitation is about 26 to 45 inches.

This unit is 60 percent Rock outcrop, 20 percent Chawanakee coarse sandy loam, and 15 percent Chaix sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Chawanakee

Chaix

Depth

8 to 20 in

20 to 40 in

Available Water Capacity

Very low

Low

Total

1 to 2 in

3 to 4 in

Upper 20"

1 in

2 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

C

B

Drainage Class

Somewhat excessively drained

Well drained or somewhat excessively drained

Runoff

Rapid

Rapid

Max Erosion Hazard

High

High

Erosion Factor (K)

0.28

0.24

Unified Soil Class

SM

SM

Soil & Rock Color

High

High

Soil Manageability Class

4ED

3Ep

Timber Production

CMAI (cu ft/acre)

20 to 49

50 to 84

Suitability

Poorly suited

Poorly suited

Limiting Factors

Rock outcrop, high erosion hazard, regeneration difficulty—a and d

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Rock outcrop, shallow soils, plant competition, high erosion hazard

Soil Manageability Group

IV

IV

Included Areas & Remarks

Included in this unit are small areas of Dome, Toem, Cagwin, and Tollhouse soils. Included areas make up about 5 percent of the total acreage.

Rock outcrop occurs mainly as isolated outcroppings and massive exposures of granitic rock.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used for limited timber production and as rangeland in summer.

431 Rock outcrop-Chawanakee-Chaix complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Montane Chaparral, Yellow Pine Forest, and White Fir Forest. Elevation is 6,400 to 8,040 feet. The average annual precipitation is about 26 to 45 inches.

This unit is 60 percent Rock outcrop, 20 percent Chawanakee coarse sandy loam, and 15 percent Chaix sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Rock outcrop	Chawanakee	Chaix
Depth	8 to 20 in		20 to 40 in
Available Water Capacity	Very low		Low
Total	1 to 2 in		3 to 4 in
Upper 20"	1 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	C		B
Drainage Class	Somewhat excessively drained		Well drained or somewhat excessively drained
Runoff	Rapid		Rapid
Max Erosion Hazard	Very high		High
Erosion Factor (K)	0.28		0.24
Unified Soil Class	SM		SM
Soil & Rock Color	High		High
Soil Manageability Class	4EDX		4Ep
Timber Production			
CMAI (cu ft/acre)	20 to 49		50 to 84
Suitability	Poorly suited		Poorly suited
Limiting Factors	Rock outcrop, very high erosion hazard, regeneration difficulty—a and d		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Rock outcrop, shallow soils, steep slopes, plant competition, very high erosion hazard		
Soil Manageability Group	IV		IV

Included Areas & Remarks

Included in this unit are small areas of Dome, Toem, and Cagwin soils. Included areas make up about 5 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock. Runoff is very rapid. Large quantities of water concentrate on soils downslope, which increases the erosion hazard of the soils.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used for limited timber production and as limited rangeland in summer.

432 Rock outcrop-Chawanakee-Chaix complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Montane Chaparral, Yellow Pine Forest, and White Fir Forest. Elevation is 5,910 to 8,300 feet. The average annual precipitation is about 26 to 39 inches.

This unit is 60 percent Rock outcrop, 20 percent Chawanakee coarse sandy loam, and 15 percent Chaix sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Chawanakee

Chaix

Depth

8 to 20 in

20 to 40 in

Available Water Capacity

Very low

Low

Total

1 to 2 in

3 to 4 in

Upper 20"

1 in

2 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

C

B

Drainage Class

Somewhat excessively drained

Well drained or somewhat excessively drained

Runoff

Very rapid

Very rapid

Max Erosion Hazard

Very high

Very high

Erosion Factor (K)

0.28

0.24

Unified Soil Class

SM

SM

Soil & Rock Color

High

High

Soil Manageability Class

4GDX

3Gp

Timber Production

CMAI (cu ft/acre)

20 to 49

50 to 84

Suitability

Poorly suited

Poorly suited

Limiting Factors

Rock outcrop, shallow soils, very steep slopes, regeneration difficulty—a and d, very high erosion hazard

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Rock outcrop, shallow soils, very steep slopes, very high erosion hazard, plant competition

Soil Manageability Group

IV

IV

Included Areas & Remarks

Included in this unit are small areas of Dome, Toem, and Cagwin soils. Included areas make up about 5 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used as habitat for wildlife.

434 Rock outcrop-Baldmountain complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest, White Fir Forest, and Yellow Pine Forest. Elevation is 6,790 to 9,010 feet. The average annual precipitation is about 18 to 25 inches.

This unit is 50 percent Rock outcrop and 40 percent Baldmountain silt loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Baldmountain

Depth

40 to 60 in

Available Water Capacity
Total
Upper 20"

Moderate
7 to 9 in
3 in

Permeability

Moderate

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Rapid

Max Erosion Hazard

High

Erosion Factor (K)

0.24

Unified Soil Class

CL/ML

Soil & Rock Color

Intermediate

Soil Manageability Class

3E

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

50 to 119
Suitable

Rock outcrop, high erosion hazard

Range Production
Seasons of Use
Limiting Factors

Summer

Rock outcrop, steep slopes, plant competition

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Tollhouse soils, Toem soils, Cagwin soils, and Wind River family soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs mainly as isolated outcroppings and massive exposures of metasedimentary or metamorphic rock.

The Baldmountain soil is deep and formed in residuum derived dominantly from metasedimentary or metamorphic rock. Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is brown silt loam and loam about 28 inches thick. The substratum is yellowish brown loam about 16 inches thick over highly weathered metasedimentary rock. In some areas the surface layer is loam.

This unit is used mainly for timber production. It is also used for mining and as limited rangeland in summer.

435 Rock outcrop-Baldmountain complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest, White Fir Forest, and Yellow Pine Forest. Elevation is 7,185 to 10,007 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 50 percent Rock outcrop and 40 percent Baldmountain silt loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Rock outcrop

Baldmountain

Depth

40 to 60 in

Available Water Capacity Total Upper 20"

Moderate
7 to 9 in
3 in

Permeability

Moderate

Hydrologic Soil Group

B

Drainage Class

Well drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.24

Unified Soil Class

CL/ML

Soil & Rock Color

Intermediate

Soil Manageability Class

3G

Timber Production CMAI (cu ft/acre) Suitability Limiting Factors

50 to 119
Suitable

Very steep slopes, rock outcrop, very high erosion hazard

Range Production Seasons of Use Limiting Factors

Summer

Rock outcrop, very steep slopes, plant competition

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Toem, Cagwin, and Cannell soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of metasedimentary or metamorphic rock.

The Baldmountain soil is deep and formed in residuum derived dominantly from metasedimentary or metamorphic rock. Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is brown silt loam and loam about 28 inches thick. The substratum is yellowish brown loam about 16 inches thick over highly weathered metasedimentary rock. In some areas the surface layer is loam.

This unit is used mainly for timber production. It is also used for mining and as limited rangeland in summer.

443 Rubble land-Xerorthents complex, 5 to 30 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on mountainsides and ridges. It supports little if any vegetation. Elevation is 9,790 to 11,210 feet. The average annual precipitation is about 20 to 30 inches.

This unit is 50 percent Rubble land and 30 percent Xerorthents. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit
Components

Rubble land

Xerorthents

Depth

Varies

Available Water Capacity
Total
Upper 20"

Low

Varies

Varies

Permeability

Varies

Hydrologic Soil Group

D

Drainage Class

Well drained or somewhat excessively drained

Runoff

Medium or rapid

Max Erosion Hazard

High

Erosion Factor (K)

Varies

Unified Soil Class

GP-GW

Soil & Rock Color

High

Soil Manageability
Class

4EPX

Timber Production
CMAI (cu ft/acre)
Suitability
Limiting Factors

—

Incapable

Range Production
Seasons of Use
Limiting Factors

Unsuitable

Soil Manageability
Group

IV

Included Areas &
Remarks

Included in this unit are small areas of Rock outcrop. Included areas make up about 20 percent of the total acreage.

Rubble land consists of areas of cobbles, stones, and boulders.

Xerorthents formed in unconsolidated recent colluvium. Texture and the content of rock fragments are variable. Xerorthents do not have distinct layers.

444 Rock outcrop-Brader-Siskiyou families complex, 20 to 60 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Yellow Pine Forest and Montane Chaparral. Elevation is 3,280 to 8,040 feet. The average annual precipitation is about 14 to 26 inches.

This unit is 60 percent Rock outcrop, 20 percent Brader family gravelly coarse sandy loam, and 15 percent Siskiyou family loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Rock outcrop	Brader family	Siskiyou family
Depth	8 to 20 in		20 to 30 in
Available Water Capacity	Low to very low		Low
Total	1 to 3 in		3 to 4 in
Upper 20"	1 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	C		B
Drainage Class	Somewhat excessively drained		Well drained or somewhat excessively drained
Runoff	Rapid to very rapid		Rapid to very rapid
Max Erosion Hazard	Very high		High
Erosion Factor (K)	0.28		0.24
Unified Soil Class	SM		SM
Soil & Rock Color	High		High
Soil Manageability Class	4ED		3Ep
Timber Production			
CMAI (cu ft/acre)	20 to 49		50 to 84
Suitability	Poorly suited		Poorly suited
Limiting Factors	Regeneration difficulty—d and f, very high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Rock outcrop, steep slopes, plant competition, very high erosion hazard		
Soil Manageability Group	IV		IV

Depth

Available Water Capacity

Total

Upper 20"

Permeability

Hydrologic Soil Group

Drainage Class

Runoff

Max Erosion Hazard

Erosion Factor (K)

Unified Soil Class

Soil & Rock Color

Soil Manageability Class

Timber Production

CMAI (cu ft/acre)

Suitability

Limiting Factors

Range Production

Seasons of Use

Limiting Factors

Soil Manageability Group

Included Areas & Remarks

Included in this unit are small areas of Dome, Chaix and Chawanakee soils. Included areas make up about 5 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Brader family soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is brown gravelly coarse sandy loam about 6 inches thick. The subsoil is light yellowish brown gravelly sandy loam about 10 inches thick over highly weathered granitic rock.

The Siskiyou family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loam about 5 inches thick. The subsoil is brown gravelly coarse sandy loam about 18 inches thick. The substratum is brown gravelly sandy loam about 5 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used for limited timber production and as limited rangeland in summer.

445 Rock outcrop-Cieneba-Brader family complex, 50 to 75 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on foothills, mountainsides, and ridges. It is in a transitional area; soil temperature ranges from warm to cool. The native plant communities are Foothill Woodland, Mixed Chaparral, and Montane Chaparral. Elevation is 3,280 to 7,380 feet. The average annual precipitation is about 8 to 26 inches.

This unit is 70 percent Rock outcrop, 10 percent Cieneba coarse sandy loam, and 10 percent Brader family gravelly coarse sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit
Components

Rock outcrop

Cieneba

Brader family

Depth

4 to 20 in

8 to 20 in

Available Water Capacity

Very low

Low to very low

Total

1 to 2 in

1 to 3 in

Upper 20"

1 in

1 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

C

C

Drainage Class

Somewhat excessively
drained

Somewhat excessively drained

Runoff

Very rapid

Very rapid

Max Erosion Hazard

Very high

Very high

Erosion Factor (K)

0.32

0.28

Unified Soil Class

SM

SM

Soil & Rock Color

High

High

Soil Manageability
Class

3GD

4GD

Timber Production

CMAI (cu ft/acre)

—

20 to 49

Suitability

Unsuitable

Poorly suited

Limiting Factors

Range Production

Seasons of Use

Spring and
summer

Spring and
summer

Limiting Factors

Rock outcrop, shallow soils, very high erosion hazard, very steep slopes

Soil Manageability
Group

IV

IV

Included Areas &
Remarks

Included in this unit are small areas of Chawanakee soils, Siskiyou family soils, and Tollhouse soils. Included areas make up about 10 percent of the total acreage.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Cieneba soil is shallow and formed in residuum derived from granitic rock. Typically, the soil is pale brown coarse sandy loam about 12 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

The Brader family soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is brown gravelly coarse sandy loam about 6 inches thick. The subsoil is light yellowish brown gravelly sandy loam about 10 inches thick over highly weathered granitic rock.

This unit is used as limited rangeland in spring and summer.

446 Siskiyou-Brader families-Rock outcrop complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest and Montane Chaparral. Elevation is 5,970 to 7,810 feet. The average annual precipitation is about 14 to 26 inches.

This unit is 55 percent Siskiyou family loam, 25 percent Brader family gravelly coarse sandy loam, and 10 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Siskiyou family	Brader family	Rock outcrop
Depth	20 to 30 in	8 to 20 in	
Available Water Capacity	Low	Low to very low	
	Total	3 to 4 in	1 to 3 in
	Upper 20"	2 in	1 in
Permeability	Moderately rapid	Moderately rapid	
Hydrologic Soil Group	B	C	
Drainage Class	Well drained or somewhat excessively drained	Somewhat excessively drained	
Runoff	Rapid to medium	Rapid	
Max Erosion Hazard	Moderate	Moderate	
Erosion Factor (K)	0.24	0.28	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2ep	3eD	
Timber Production	CMAI (cu ft/acre)	50 to 84	20 to 49
	Suitability	Poorly suited	Poorly suited
	Limiting Factors	regeneration difficulty—d and f	
Range Production	Seasons of Use	Summer	Summer
	Limiting Factors	Plant competition, shallow soils	
Soil Manageability Group	III	III	

Depth

Available Water Capacity

Permeability

Hydrologic Soil Group

Drainage Class

Runoff

Max Erosion Hazard

Erosion Factor (K)

Unified Soil Class

Soil & Rock Color

Soil Manageability Class

Timber Production

Range Production

Seasons of Use

Soil Manageability Group

Included Areas & Remarks

Included in this unit are small areas of Chaix, Chawanakee, and Dome soils. Included areas make up about 10 percent of the total acreage.

The Siskiyou family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loam about 5 inches thick. The subsoil is brown gravelly sandy loam about 18 inches thick. The substratum is brown gravelly coarse sandy loam about 5 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

The Brader family soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is brown gravelly coarse sandy loam about 6 inches thick. The subsoil is light yellowish brown gravelly sandy loam about 10 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

447 Siskiyou family-Rock outcrop-Brader family complex, 30 to 75 percent slopes.

**Physiographic
Location,
Elevation, and
Precipitation**

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest and Montane Chaparral. Elevation is 4,860 to 8,040 feet. The average annual precipitation is about 10 to 26 inches.

This unit is 45 percent Siskiyou family loam, 30 percent Rock outcrop, and 20 percent Brader family coarse sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

**Soil Map Unit
Components**

Siskiyou family

Rock outcrop

Brader family

Depth

20 to 30 in

8 to 20 in

Available Water Capacity

Low

Low to very low

Total

3 to 4 in

1 to 3 in

Upper 20"

2 in

1 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

B

C

Drainage Class

Well drained or somewhat
excessively drained

Somewhat excessively drained

Runoff

Very rapid to rapid

Very rapid to rapid

Max Erosion Hazard

High

High

Erosion Factor (K)

0.24

0.28

Unified Soil Class

SM

SM

Soil & Rock Color

Intermediate

Intermediate

**Soil Manageability
Class**

3Ep

4ED

Timber Production

CMAI (cu ft/acre)

50 to 84

20 to 49

Suitability

Poorly suited

Poorly suited

Limiting Factors

Regeneration difficulty—d and f, very steep slopes, high erosion hazard

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Rock outcrop, plant competition, very steep slopes

**Soil Manageability
Group**

IV

IV

**Included Areas &
Remarks**

Included in this unit are small areas of Chaix, Chawanakee, and Dome soils. Included areas make up about 5 percent of the total acreage.

The Siskiyou family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loam about 5 inches thick. The subsoil is brown gravelly sandy loam about 18 inches thick. The substratum is brown gravelly coarse sandy loam about 5 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Brader family soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is brown coarse sandy loam about 6 inches thick. The subsoil is light yellowish brown sandy loam about 10 inches thick over highly weathered granitic rock.

This unit is used mainly as limited rangeland in summer. It is also used for limited timber production.

500 Tollhouse-Rock outcrop complex, 10 to 30 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on mountainsides. The native plant communities are Pinyon-Juniper Woodland, Sagebrush Scrub, and Montane Chaparral. Elevation is 5,810 to 8,200 feet. The average annual precipitation is about 12 to 24 inches.

This unit is 65 percent Tollhouse coarse sandy loam and 25 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit
Components

Tollhouse

Rock outcrop

Depth

8 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Moderately rapid

Hydrologic Soil Group

D

Drainage Class

Somewhat excessively drained

Runoff

Rapid

Max Erosion Hazard

Moderate

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability
Class

2epd

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Summer

Limiting Factors

rock outcrop, plant competition, shallow soils

Soil Manageability
Group

II

Included Areas &
Remarks

Included in this unit are small areas of Chaix soils. Included areas make up about 10 percent of the total acreage.

The Tollhouse soil is shallow and formed in residuum derived dominantly from granitic or metamorphic rock. Typically, the soil is brown coarse sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic or metamorphic rock.

This unit is used as rangeland in summer.

501 Tollhouse-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Pinyon-Juniper Woodland, Sagebrush Scrub, and Montane Chaparral. Elevation is 6,000 to 6,600 feet. The average annual precipitation is about 12 to 24 inches.

This unit is 65 percent Tollhouse coarse sandy loam and 25 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Tollhouse

Rock outcrop

Depth

8 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Moderately rapid

Hydrologic Soil Group

D

Drainage Class

Somewhat excessively drained

Runoff

Rapid

Max Erosion Hazard

High

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

3Ep

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Summer

Limiting Factors

rock outcrop, steep slopes, plant competition, shallow soils, high erosion hazard

Soil Manageability Group

III

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils. Included areas make up about 10 percent of the total acreage.

The Tollhouse soil is shallow and formed in residuum derived from granitic or metamorphic rock. Typically, the soil is brown coarse sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic or metamorphic rock.

This unit is used as limited rangeland in summer.

502 Tollhouse-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Pinyon-Juniper Woodland, Mountain Sagebrush Scrub, and Montane Chaparral. Elevation is 4,400 to 8,010 feet. The average annual precipitation is about 12 to 24 inches.

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

Soil Map Unit Components

Tollhouse

Rock outcrop

Depth

8 to 20 in

Available Water Capacity

Very low

Total

1 to 2 in

Upper 20"

2 in

Permeability

Moderately rapid

Hydrologic Soil Group

D

Drainage Class

Somewhat excessively drained

Runoff

Very rapid

Max Erosion Hazard

Very high

Erosion Factor (K)

0.32

Unified Soil Class

SM

Soil & Rock Color

High

Soil Manageability Class

3Ep

Timber Production

CMAI (cu ft/acre)

—

Suitability

Incapable

Limiting Factors

Range Production

Seasons of Use

Summer

Limiting Factors

rock outcrop, very steep slopes, plant competition, shallow soils, very high erosion hazard

Soil Manageability Group

IV

Included Areas & Remarks

Included in this unit are small areas of Cieneba soils. Included areas make up about 10 percent of the total acreage.

The Tollhouse soil is shallow and formed in residuum derived from granitic or metamorphic rock. Typically, the soil is brown coarse sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic or metamorphic rock.

This unit is used as limited rangeland in summer.

503 Tollhouse-Chaix association, 10 to 30 percent slopes.

Physiographic
Location,
Elevation, and
Precipitation

This map unit is on mountainsides. Slope is 10 to 30 percent. The native plant communities are Juniper Woodland, Sagebrush Scrub, and Montane Chaparral. Elevation is 5,000 to 6,990 feet. The average annual precipitation is about 12 to 35 inches.

This unit is 70 percent Tollhouse coarse sandy loam and 20 percent Chaix sandy loam.

Soil Map Unit
Components

Tollhouse

Chaix*

Depth
Available Water Capacity
 Total
 Upper 20"
Permeability
Hydrologic Soil Group
Drainage Class
Runoff
Max Erosion Hazard
Erosion Factor (K)
Unified Soil Class
Soil & Rock Color
Soil Manageability
Class
Timber Production
 CMAI (cu ft/acre)
 Suitability
 Limiting Factors
Range Production
 Seasons of Use
 Limiting Factors
Soil Manageability
Group
Included Areas &
Remarks

8 to 20 in	20 to 40 in
Very low	Low
1 to 2 in	3 to 4 in
2 in	2 in
Moderately rapid	Moderately rapid
D	B
Somewhat excessively drained	Well drained or somewhat excessively drained
Rapid	Medium to rapid
Moderate	Moderate
0.32	0.24
SM	SM
High	High
2ep	2ep
—	50 to 84
Unsuitable	Poorly suited
Summer	Summer
Plant competition, shallow soils	
II	II

Included in this unit are small areas of Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Tollhouse soil is shallow and formed in residuum derived from granitic or metamorphic rock. Typically, the soil is brown coarse sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used as rangeland in summer.

* Footnote: Vegetation not typical for the Chaix series.

509 Chaix-Wind River family-Tollhouse association, 5 to 15 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and in upland basins. Slope is 5 to 15 percent. The native plant communities are Pinyon-Juniper Woodland, Sagebrush Scrub, Yellow Pine Forest, and Montane Chaparral. Elevation is 5,250 to 7,870 feet. The average annual precipitation is about 12 to 20 inches.

This unit is 50 percent Chaix sandy loam, 25 percent Wind River family loam, and 15 percent Tollhouse coarse sandy loam.

Soil Map Unit Components

	Chaix*	Wind River family	Tollhouse
Depth	20 to 40 in	40 to 60+ in	8 to 20 in
Available Water Capacity	Low	Low to moderate	Very low
Total	3 to 4 in	4 to 6 in	1 to 2 in
Upper 20"	2 in	3 in	2 in
Permeability	Moderately rapid	Moderate	Moderately rapid
Hydrologic Soil Group	B	B	D
Drainage Class	Well drained or somewhat excessively drained	Well or moderately well drained	Somewhat excessively drained
Runoff	Medium	Medium	Medium
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (K)	0.24	0.20	0.32
Unified Soil Class	SM	ML/SC	SM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	2ep	2e	3e
Timber Production			
CMAI (cu ft/acre)	50 to 84	85 to 119	—
Suitability	Poorly suited	Suitable	Incapable
Limiting Factors	regeneration difficulty—a, d, and f		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	II

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Wind River family soil is deep and formed in residuum derived from metamorphic, metasedimentary, or granitic rock. Typically, the surface layer is brown loam about 12 inches thick. The subsoil is brown and strong brown loam and gravelly loam about 20 inches thick. The substratum is pinkish gray very gravelly sandy loam about 10 inches thick over fractured metasedimentary rock.

The Tollhouse soil is shallow and formed in residuum derived from granitic or metasedimentary rock. Typically, the surface layer is brown coarse sandy loam about 7 inches thick. The subsoil is brown loamy sand about 16 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam or silt loam.

This unit is used mainly as rangeland in summer. It is also used for limited timber production.

* Footnote: Vegetation not typical for the Chaix series.

601 Brownlee family-Hotaw Variant complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 3,940 to 6,990 feet. The average annual precipitation is about 30 to 39 inches.

This unit is 60 percent Brownlee family very fine sandy loam and 30 percent Hotaw Variant loam. The components of this map unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Brownlee family

Hotaw variant

Depth

60+ in

20 to 30 in

Available Water Capacity

Moderate

Low

Total

5 to 9 in

3 to 5 in

Upper 20"

3 in

2 in

Permeability

Moderately slow

Moderately slow

Hydrologic Soil Group

B

B

Drainage Class

Well drained

Well drained

Runoff

Rapid

Medium or rapid

Max Erosion Hazard

High

Moderate

Erosion Factor (K)

0.37

0.37

Unified Soil Class

ML-CL/SC

SC/CL

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

3E

2e

Timber Production

CMAI (cu ft/acre)

85 to 119

50 to 84

Suitability

Suitable

Suitable

Limiting Factors

Steep slopes

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition, steep slopes

Soil Manageability Group

III

III

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Brownlee family soil is deep and formed in residuum derived from metamorphic and metasedimentary rock. Typically, the surface layer is brown very fine sandy loam and loam about 15 inches thick. The subsoil is yellowish brown and brownish yellow sandy clay loam about 51 inches thick over weathered metamorphic rock.

The Hotaw Variant soil is moderately deep and formed in residuum derived from metamorphic and metasedimentary rock. Typically, the surface layer is dark brown loam about 5 inches thick. The subsoil is dark brown gravelly loam and gravelly clay loam about 23 inches thick over fractured metasedimentary rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

603 Cannell-Sirretta-Nanny family complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Red Fir Forest, White Fir Forest, and Lodgepole Pine Forest. Elevation is 7,220 to 9,810 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 35 percent Cannell sandy loam, 25 percent Sirretta gravelly coarse sandy loam, and 20 percent Nanny family stony sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Cannell	Sirretta	Nanny family
Depth	40 to 60 in	20 to 40 in	60+ in
Available Water Capacity	Moderate	Low to very low	Moderate to low
Total	5 to 7 in	1 to 2 in	4 to 6 in
Upper 20"	2 in	1 in	2 in
Permeability	Moderately rapid	Rapid	Moderately rapid
Hydrologic Soil Group	B	A	B
Drainage Class	Well drained	Excessively drained	Well drained
Runoff	Medium to rapid	Medium to rapid	Medium to rapid
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (K)	0.20	0.17	0.29
Unified Soil Class	SM	GM/SW	SM/GM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	2ep	4ePX	3epX
Timber Production			
CMAI (cu ft/acre)	85 to 119	20 to 49	50 to 84
Suitability	Suitable	Suitable	Suitable
Limiting Factors	Regeneration difficulty—b, d, and e		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	II

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop, Toem soils, Cagwin soils, Monache soils, and Monache Variant soils, drained. Included areas make up about 20 percent of the total acreage.

The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Sirretta soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark grayish brown gravelly coarse sandy loam about 6 inches thick. The substratum is brown and light yellowish brown extremely cobbly loamy sand about 22 inches thick over fractured granitic rock.

The Nanny family soil is deep and formed in residuum derived from granitic rock. This soil is 35 to 80 percent gravel and cobbles. Typically, the surface layer is very dark grayish brown stony sandy loam about 6 inches thick. The subsoil is brown and pale brown sandy loam and extremely gravelly fine sandy loam about 23 inches thick. The substratum is yellowish brown loamy fine sand and very gravelly loamy fine sand about 46 inches thick over highly weathered granitic rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

604 Cannell-Sirretta-Nanny family complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Red Fir Forest, White Fir Forest, and Lodgepole Pine Forest. Elevation is 7,220 to 9,020 feet. The average annual precipitation is about 24 to 45 inches.

This unit is 35 percent Cannell sandy loam, 25 percent Sirretta gravelly coarse sandy loam, and 20 percent Nanny family stony sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Cannell	Sirretta	Nanny family
Depth	40 to 60 in	20 to 40 in	60+ in
Available Water Capacity	Moderate	Low to very low	Moderate to low
Total	5 to 7 in	1 to 2 in	4 to 6 in
Upper 20"	2 in	1 in	2 in
Permeability	Moderately rapid	Rapid	Moderately rapid
Hydrologic Soil Group	B	A	B
Drainage Class	Well drained	Excessively drained	Well drained
Runoff	Rapid	Rapid	Rapid
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (K)	0.20	0.17	0.29
Unified Soil Class	SM	GM/SW	SM/GM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	2ep	4ePX	4EpX
Timber Production			
CMAI (cu ft/acre)	85 to 119	20 to 49	50 to 84
Suitability	Suitable	Suitable	Suitable
Limiting Factors	Regeneration difficulty—b, d, and e		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Steep slopes, plant competition		
Soil Manageability Group	IV	IV	IV

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop, Toem soils, Cagwin soils, Monache soils, and Monache Variant soils, drained. Included areas make up about 20 percent of the total acreage.

The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Sirretta soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark grayish brown gravelly coarse sandy loam about 6 inches thick. The substratum is brown and light yellowish brown extremely cobbly loamy sand about 22 inches thick over fractured granitic rock.

The Nanny family soil is deep and formed in residuum derived from granitic rock. This soil is 35 to 80 percent gravel and cobbles. Typically, the surface layer is very dark grayish brown stony sandy loam about 6 inches thick. The subsoil is brown and pale brown sandy loam and extremely gravelly fine sandy loam about 23 inches thick. The substratum is yellowish brown loamy fine sand and very gravelly loamy fine sand about 46 inches thick over highly weathered granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

606 Toem-Rock outcrop-Cagwin complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Lodgepole Pine Forest, Red Fir Forest, and Montane Chaparral. Elevation is 6,400 to 9,600 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 45 percent Toem loamy sand, 30 percent Rock outcrop, and 15 percent Cagwin loamy sand. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Toem	Rock outcrop	Cagwin
Depth	4 to 20 in		20 to 40 in
Available Water Capacity	Very low		Very low
Total	1 to 2 in		1 to 2 in
Upper 20"	2 in		2 in
Permeability	Rapid		Rapid
Hydrologic Soil Group	D		C
Drainage Class	Excessively drained		Somewhat excessively drained
Runoff	Rapid		Rapid
Max Erosion Hazard	Moderate		Moderate
Erosion Factor (K)	0.32		0.29
Unified Soil Class	SM		SM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	2edp		2ep
Timber Production			
CMAI (cu ft/acre)	20 to 49		50 to 84
Suitability	Poorly suited		Poorly suited
Limiting Factors	Regeneration difficulty—a, b, and d		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Rock outcrop, plant competition, shallow soils		
Soil Manageability Group	II		II
Included Areas & Remarks	<p>Included in this unit are small areas of Sirretta soils, Cannell soils, Nanny family soils, Monache soils, and Monache Variant soils, drained. Included areas make up about 10 percent of the total acreage.</p> <p>The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.</p> <p>Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.</p> <p>The Cagwin soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loamy sand about 13 inches thick. The substratum is pale brown loamy coarse sand about 21 inches thick over highly weathered granitic rock. In some areas the surface layer is loamy coarse sand.</p> <p>This unit is used mainly for timber production. It is also used for rangeland in summer.</p>		

607 Toem-Rock outcrop-Cagwin complex, 30 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Lodgepole Pine Forest, Red Fir Forest, and Montane Chaparral. Elevation is 6,400 to 9,890 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 45 percent Toem loamy sand, 30 percent Rock outcrop, and 15 percent Cagwin loamy sand. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Depth

Toem 4 to 20 in

Cagwin 20 to 40 in

Available Water Capacity

Toem Very low

Cagwin Very low

Total

Toem 1 to 2 in

Cagwin 1 to 2 in

Upper 20"

Toem 2 in

Cagwin 2 in

Permeability

Toem Rapid

Cagwin Rapid

Hydrologic Soil Group

Toem D

Cagwin C

Drainage Class

Toem Excessively drained

Cagwin Somewhat excessively drained

Runoff

Toem Very rapid

Cagwin Very rapid

Max Erosion Hazard

Toem Very high

Cagwin Very high

Erosion Factor (K)

Toem 0.32

Cagwin 0.29

Unified Soil Class

Toem SM

Cagwin SM

Soil & Rock Color

Toem Intermediate

Cagwin Intermediate

Soil Manageability Class

Toem 3Ed

Cagwin 3Ep

Timber Production

CMAI (cu ft/acre)

Toem 20 to 49

Cagwin 50 to 84

Suitability

Toem Poorly suited

Cagwin Poorly suited

Limiting Factors

Toem Regeneration difficulty—a, b and d, very high erosion hazard

Range Production

Seasons of Use

Toem Summer

Cagwin Summer

Limiting Factors

Toem Rock outcrop, shallow soil, very steep slopes, plant competition, very high erosion hazard

Soil Manageability Group

Toem III

Cagwin III

Included Areas & Remarks

Included in this unit are small areas of Sirretta soils, Cannell soils, Nanny family soils, Monache soils, and Monache Variant soils, drained. Included areas make up about 10 percent of the total acreage.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granite.

The Cagwin soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loamy sand about 13 inches thick. The substratum is pale brown loamy coarse sand about 21 inches thick over highly weathered granitic rock. In some areas the surface layer is loamy coarse sand.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

609 Cagwin-Toem-Rock outcrop complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Red Fir Forest and Lodgepole Pine Forest. Elevation is 7,220 to 9,580 feet. The average annual precipitation is about 24 to 49 inches.

This unit is 45 percent Cagwin loamy sand, 25 percent Toem loamy sand, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Depth

Cagwin

Toem

Rock outcrop

20 to 40 in

4 to 20 in

Available Water Capacity

Very low

Very low

Total

1 to 2 in

1 to 2 in

Upper 20"

2 in

2 in

Permeability

Rapid

Rapid

Hydrologic Soil Group

C

D

Drainage Class

Somewhat excessively drained

Excessively drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.29

0.32

Unified Soil Class

SM

SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

2ep

2ed

Timber Production

CMAI (cu ft/acre)

50 to 84

20 to 49

Suitability

Poorly suited

Poorly suited

Limiting Factors

Regeneration difficulty—a, b, and d, erosion hazard

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition, shallow soils, rock outcrop

Soil Manageability Group

II

II

Included Areas & Remarks

Included in this unit are small areas of Sirretta soils, Cannell soils, Nanny family soils, Monache soils, and Monache Variant soils, drained. Included areas make up about 15 percent of the total acreage.

The Cagwin soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loamy sand about 13 inches thick. The substratum is pale brown loamy coarse sand 21 inches thick over highly weathered granitic rock. In some areas the surface layer is loamy coarse sand.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

610 Cagwin-Toem-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Red Fir Forest and Lodgepole Pine Forest. Elevation is 7,220 to 9,200 feet. The average annual precipitation is about 24 to 49 inches.

This unit is 45 percent Cagwin loamy sand, 25 percent Toem loamy sand, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Cagwin	Toem	Rock outcrop
Depth	20 to 40 in	4 to 20 in	
Available Water Capacity	Very low	Very low	
Total	1 to 2 in	1 to 2 in	
Upper 20"	2 in	2 in	
Permeability	Rapid	Rapid	
Hydrologic Soil Group	C	D	
Drainage Class	Somewhat excessively drained	Excessively drained	
Runoff	Rapid	Rapid	
Max Erosion Hazard	High	High	
Erosion Factor (K)	0.29	0.32	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	3Ep	3Ed	
Timber Production			
CMAI (cu ft/acre)	50 to 84	20 to 49	
Suitability	Poorly suited	Poorly suited	
Limiting Factors	Regeneration difficulty—a, b and d, high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition, steep slopes, shallow soils, rock outcrop		
Soil Manageability Group	III	III	

Included Areas & Remarks

Included in this unit are small areas of Sirretta soils, Cannell soils, Nanny family soils, Monache soils, and Monache Variant soils, drained. Included areas make up about 15 percent of the total acreage.

The Cagwin soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loamy sand about 13 inches thick. The substratum is pale brown loamy coarse sand 21 inches thick over highly weathered granitic rock. In some areas the surface layer is loamy coarse sand.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

611 Cagwin-Toem-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Red Fir Forest, Lodgepole Pine Forest, and Montane Chaparral. Elevation is 7,550 to 9,190 feet. The average annual precipitation is about 24 to 35 inches.

This unit is 45 percent Cagwin loamy sand, 25 percent Toem loamy sand, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Cagwin	Toem	Rock outcrop
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Depth

20 to 40 in	4 to 20 in	
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Available Water Capacity

Very low	Very low	
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Total

1 to 2 in	1 to 2 in	
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Upper 20"

2 in	2 in	
------	------	--

Permeability

Rapid	Rapid	
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Hydrologic Soil Group

C	D	
---	---	--

Drainage Class

Somewhat excessively drained	Excessively drained	
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Runoff

Very rapid	Very rapid	
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Max Erosion Hazard

High	High	
------	------	--

Erosion Factor (K)

0.29	0.32	
------	------	--

Unified Soil Class

SM	SM	
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Soil & Rock Color

Intermediate	Intermediate	
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Soil Manageability Class

3Gp	3Gd	
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Timber Production

CMAI (cu ft/acre)

50 to 84	20 to 49	
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Suitability

Poorly suited	Poorly suited	
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Limiting Factors

Regeneration difficulty—a, b and d, steep slopes, high erosion hazard		
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Range Production

Seasons of Use

Summer	Summer	
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Limiting Factors

Plant competition, very steep slopes, shallow soils, rock outcrop		
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Soil Manageability Group

IV	IV	
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Included Areas & Remarks

Included in this unit are small areas of Sirretta soils, Cannell soils, and Nanny family soils. Included areas make up about 15 percent of the total acreage.

The Cagwin soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loamy sand about 13 inches thick. The substratum is pale brown loamy coarse sand 21 inches thick over highly weathered granitic rock. In some areas the surface layer is loamy coarse sand.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

612 Baldmountain-Rock outcrop-Jumpe family complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest and White Fir Forest. Elevation is 7,220 to 8,530 feet. The average annual precipitation is about 20 to 35 inches.

This unit is 50 percent Baldmountain silt loam, 20 percent Rock outcrop, and 20 percent Jumpe family sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Baldmountain	Rock outcrop	Jumpe family
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Depth

40 to 60 in

60+ in

Available Water Capacity

Moderate

Low

Total

7 to 9 in

3 to 5 in

Upper 20"

3 in

2 in

Permeability

Moderate

Moderately rapid

Hydrologic Soil Group

B

B

Drainage Class

Well drained

Well drained

Runoff

Medium

Medium

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.24

0.17

Unified Soil Class

CL/ML

SM/GM

Soil & Rock Color

Low

Low

Soil Manageability Class

2e

2ep

Timber Production

CMAI (cu ft/acre)

50 to 119

50 to 84

Suitability

Suitable

Suitable

Limiting Factors

Regeneration difficulty—b and e

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition

Soil Manageability Group

II

II

Included Areas & Remarks

Included in this unit are small areas of Toem soils, Cagwin soils, Cannell soils, and Nanny family soils. Included areas make up about 10 percent of the total acreage.

The Baldmountain soil is deep and formed in residuum derived from metasedimentary or metamorphic rock. Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is brown silt loam and loam about 28 inches thick. The substratum is yellowish brown loam about 16 inches thick over highly weathered metasedimentary rock. In some areas the surface layer is loam.

Rock outcrop occurs as small, isolated outcroppings and massive exposures of metamorphic or metasedimentary rock.

The Jumpe family soil is deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is brown gravelly fine sandy loam about 16 inches thick. The substratum is reddish yellow very gravelly loam and extremely gravelly and cobbly fine sandy loam about 28 inches over fractured metasedimentary rock.

This unit is used mainly for timber production. It is also used for mining and as rangeland in summer.

613 Baldmountain-Rock outcrop-Jumpe family complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest and White Fir Forest. Elevation is 7,220 to 8,530 feet. The average annual precipitation is about 20 to 35 inches.

This unit is 40 percent Baldmountain silt loam, 30 percent Rock outcrop, and 20 percent Jumpe family sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Baldmountain	Rock outcrop	Jumpe family
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Depth
Available Water Capacity
 Total
 Upper 20"
Permeability
Hydrologic Soil Group
Drainage Class
Runoff
Max Erosion Hazard
Erosion Factor (K)
Unified Soil Class
Soil & Rock Color
Soil Manageability Class
Timber Production
 CMAI (cu ft/acre)
 Suitability
 Limiting Factors
Range Production
 Seasons of Use
 Limiting Factors
Soil Manageability Group
Included Areas & Remarks

Depth	40 to 60 in		40 to 60+ in
Available Water Capacity	Moderate		Low
Total	7 to 9 in		3 to 5 in
Upper 20"	3 in		2 in
Permeability	Moderate		Moderately rapid
Hydrologic Soil Group	B		B
Drainage Class	Well drained		Well drained
Runoff	Rapid		Rapid
Max Erosion Hazard	High		High
Erosion Factor (K)	0.24		0.17
Unified Soil Class	CL/ML		SM/GM
Soil & Rock Color	Low		Low
Soil Manageability Class	3E		3Ep
Timber Production			
CMAI (cu ft/acre)	50 to 119		50 to 84
Suitability	Suitable		Suitable
Limiting Factors	Regeneration difficulty—b and d, high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Plant competition, steep slopes, rock outcrop		
Soil Manageability Group	III		III

Included in this unit are small areas of Toem soils, Cagwin soils, Cannell soils, and Nanny family soils. Included areas make up about 10 percent of the total acreage.

The Baldmountain soil is deep and formed in residuum derived from metasedimentary or metamorphic rock. Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is brown silt loam and loam about 28 inches thick. The substratum is yellowish brown loam about 16 inches thick over highly weathered metasedimentary rock. In some areas the surface layer is loam.

Rock outcrop occurs as small isolated outcroppings and massive exposures of metamorphic or metasedimentary rock.

The Jumpe family soil is deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is brown gravelly fine sandy loam about 16 inches thick. The substratum is reddish yellow very gravelly loam and extremely gravelly and cobbly fine sandy loam about 28 inches over fractured metasedimentary rock.

This unit is used mainly for timber production. It is also used for mining and as limited rangeland in summer.

618 Chaix-Chawanakee-Rock outcrop complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 4,400 to 7,870 feet. The average annual precipitation is about 26 to 39 inches.

This unit is 55 percent Chaix sandy loam, 25 percent Chawanakee coarse sandy loam, and 10 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Depth

Chaix

20 to 40 in

Chawanakee

8 to 20 in

Rock outcrop

Available Water Capacity

Low

Low to very low

Total

3 to 4 in

1 to 3 in

Upper 20"

2 in

1 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

B

C

Drainage Class

Well drained or somewhat excessively drained

Somewhat excessively drained

Runoff

Medium to rapid

Rapid

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.24

0.28

Unified Soil Class

SM

SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

2ep

3eD

Timber Production

CMAI (cu ft/acre)

50 to 84

20 to 49

Suitability

Poorly suited

Poorly suited

Limiting Factors

Regeneration difficulty—a, d, and f.

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition, rock outcrop, shallow soils

Soil Manageability Group

II

II

Included Areas & Remarks

Included in this unit are small areas of Dome and Holland soils. Included areas make up about 10 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

619 Chaix-Rock outcrop-Chawanakee complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest, Mixed Conifer Forest, and Montane Chaparral. Elevation is 5,910 to 8,040 feet. The average annual precipitation is about 26 to 32 inches.

This unit is 45 percent Chaix sandy loam, 30 percent Rock outcrop, and 15 percent Chawanakee coarse sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

Chaix

Rock outcrop

Chawanakee

Depth

20 to 40 in

8 to 20 in

Available Water Capacity

Low

Low to very low

Total

3 to 4 in

1 to 3 in

Upper 20"

2 in

1 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

B

B

Drainage Class

Well drained or somewhat excessively drained

Somewhat excessively drained

Runoff

Rapid

Rapid

Max Erosion Hazard

High

High

Erosion Factor (K)

0.24

0.28

Unified Soil Class

SM

SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

3Ep

4ED

Timber Production

CMAI (cu ft/acre)

50 to 84

20 to 49

Suitability

Poorly suited

Poorly suited

Limiting Factors

Regeneration difficulty—a, d, and f, high erosion hazard

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition

steep slopes, rock outcrop

Soil Manageability Group

III

III

Included Areas & Remarks

Included in this unit are small areas of Dome and Holland soils. Included areas make up about 10 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used mainly as limited rangeland in summer. It is also used for limited timber production.

620 Chaix-Rock outcrop-Chawanakee complex, 50 to 75 percent slopes.

**Physiographic
Location,
Elevation, and
Precipitation**

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest, Mixed Conifer Forest, and Montane Chaparral. Elevation is 4,920 to 7,550 feet. The average annual precipitation is about 26 to 39 inches.

This unit is 35 percent Chaix sandy loam, 35 percent Rock outcrop, and 25 percent Chawanakee coarse sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

**Soil Map Unit
Components**

Chaix

Rock outcrop

Chawanakee

Depth

20 to 40 in

8 to 20 in

Available Water Capacity

Low

Low to very low

Total

3 to 4 in

1 to 3 in

Upper 20"

2 in

1 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

B

B

Drainage Class

Well drained or somewhat
excessively drained

Somewhat excessively drained

Runoff

Very rapid

Very rapid

Max Erosion Hazard

High

Very high

Erosion Factor (K)

0.24

0.28

Unified Soil Class

SM

SM

Soil & Rock Color

High

High

**Soil Manageability
Class**

3Ep

4ED

Timber Production

CMAI (cu ft/acre)

50 to 84

20 to 49

Suitability

Poorly suited

Poorly suited

Limiting Factors

Regeneration difficulty—a, d, and f, very steep slopes, very high erosion hazard

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition, very steep slopes, rock outcrop

**Soil Manageability
Group**

III

III

**Included Areas &
Remarks**

Included in this unit are small areas of Dome and Holland soils. Included areas make up about 5 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used mainly as limited rangeland in summer. It is also used for limited timber production.

621 Dome-Chaix-Rock outcrop association, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. Slope is 5 to 30 percent. The native plant communities are Yellow Pine Forest and Mixed Conifer Forest. Elevation is 5,710 to 8,040 feet. The average annual precipitation is about 20 to 30 inches.

This unit is 45 percent Dome sandy loam, 20 percent Chaix sandy loam, and 20 percent Rock outcrop.

Soil Map Unit Components

Depth

Dome

Chaix

Rock outcrop

40 to 60 in

20 to 40 in

Available Water Capacity

Moderate to low

Low

Total

5 to 6 in

3 to 4 in

Upper 20"

2 in

2 in

Permeability

Moderately rapid

Moderately rapid

Hydrologic Soil Group

B

B

Drainage Class

Well drained

Well drained or somewhat excessively drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (K)

0.20

0.24

Unified Soil Class

SM

SM

Soil & Rock Color

Intermediate

Intermediate

Soil Manageability Class

2ep

3eP

Timber Production

CMAI (cu ft/acre)

85 to 164

50 to 84

Suitability

Suitable

Suitable

Limiting Factors

Regeneration difficulty—d and f

Range Production

Seasons of Use

Summer

Summer

Limiting Factors

Plant competition

Soil Manageability Group

II

II

Included Areas & Remarks

Included in this unit are small areas of Holland soils, Chawanakee soils, and Junipero family soils. Included areas make up about 15 percent of the total acreage.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.