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In cooperation with:

U.S.D.A. Soil
Conservation Service

Regents of the
University of California
(Agricultural Experiment
Station)

Soil Survey

East Part, Inyo National Forest Area California



How To Use This Soil Survey

General Soil Map

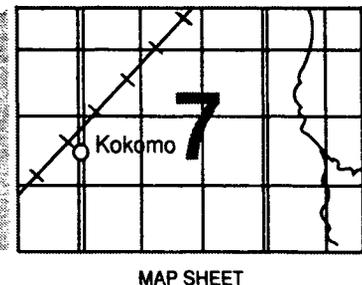
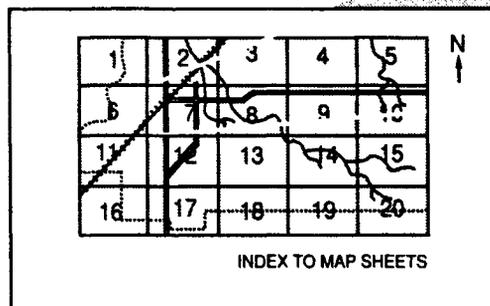
The general soil map, which is the small scale map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

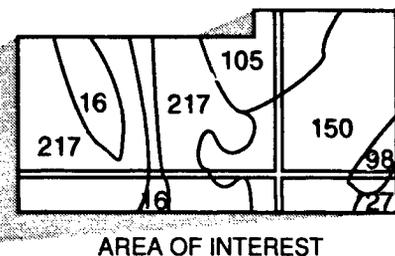
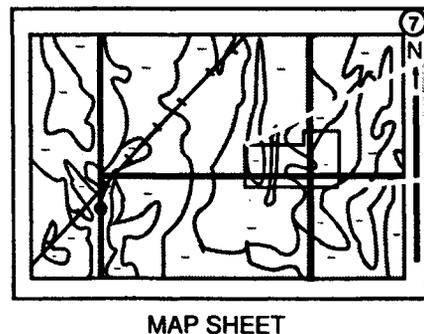
Detailed Soil Maps

The detailed soil maps are at the end of this publication. 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.



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.



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.

Inyo National Forest Area, California, East Part

This is a publication of the United States Department of Agriculture, Forest Service, Pacific Southwest Region and is a joint effort with the University of California (Agricultural Experiment Station) and the Soil Conservation Service. As a part of the National Cooperative Soil Survey, the fieldwork and technical quality control for this survey were the responsibility of the Forest Service. The correlation of the soils was done 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 this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was performed in the period 1979-82. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Forest Service and the Soil Conservation Service. The soil survey area consists of the Inyo and White Mountain Ranges, and the Pizona area on the east side of the Inyo National Forest, in Inyo and Mono Counties, California and in Esmeralda and Mineral Counties, Nevada.

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 westward from the Ancient Bristlecone Pine Forest in the White Mountain Range. The Sierra Nevada Range is in the background.

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Foreward

The Soil Survey of the Inyo National Forest Area, California, East Part, in parts of Inyo and Mono Counties, California and parts of Mineral and Esmeralda Counties, Nevada, was designed to facilitate forestwide resource management planning and to increase the knowledge of our environment. It contains predictions of soil behavior for selected land uses. It also points out inherent limitations or hazards to land uses.

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 could be used for detailed resource management and project level planning with field verification.

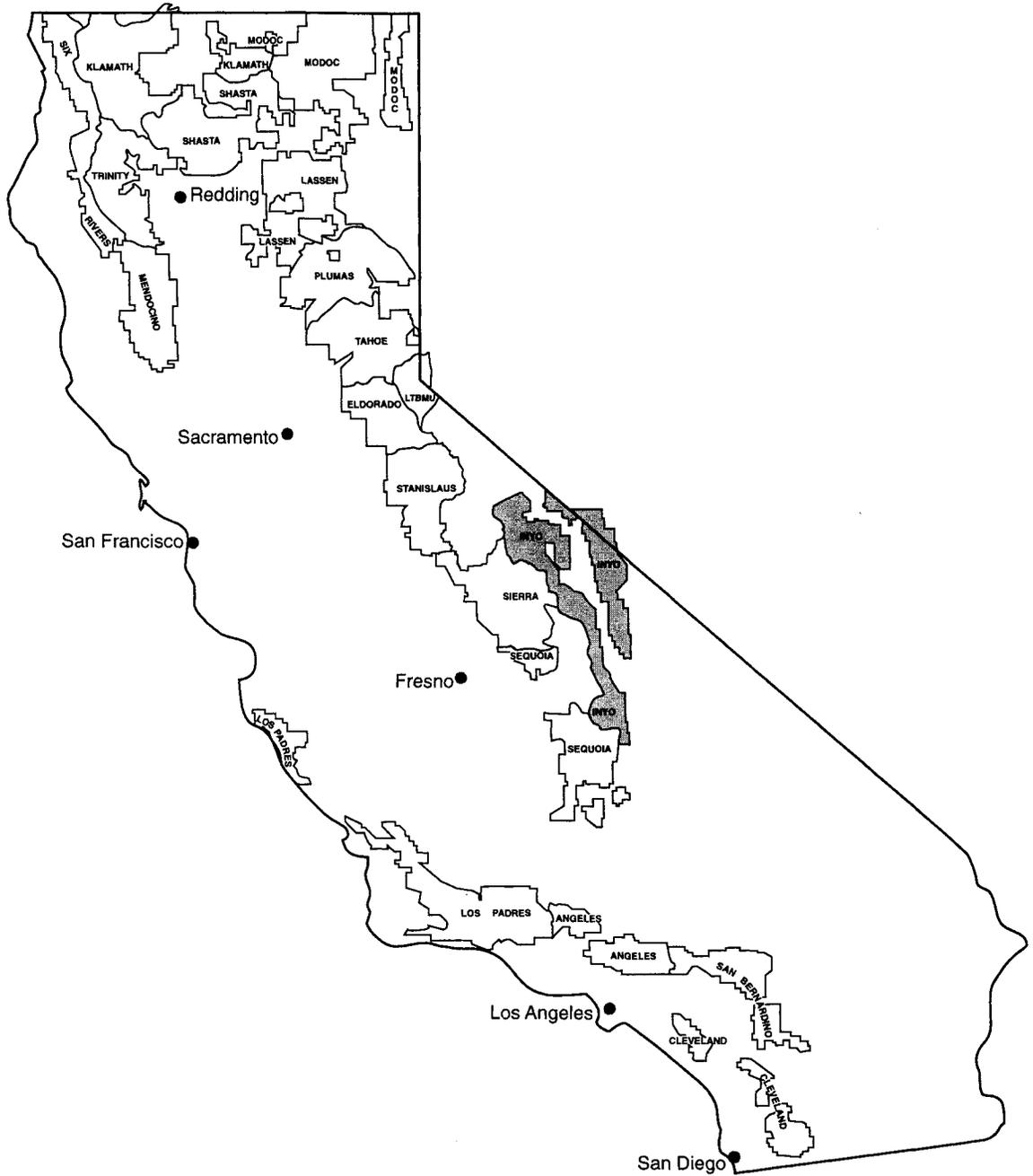
Major differences in soil properties can occur even within short distances. Some soils are shallow to bedrock and have low available water capacity. These conditions inhibit plant growth. Some soils are seasonally wet and have a high water table or are subject to flooding.

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.



DENNIS W. MARTIN
Forest Supervisor
Inyo National Forest



Location of the Inyo National Forest Area, California, East Part

Soil Survey of Inyo National Forest Area California, East Part

By Juan A. Gallegos, Forest Service

Soils surveyed by Juan A. Gallegos and B. Scott Jackson, Forest Service,
and Western Ecological Services Company

The Inyo National Forest, East Part survey area is 669,420 acres in size. The survey area is mainly in Inyo and Mono Counties, California, with small portions in Mineral and Esmeralda Counties, Nevada.

The Inyo National Forest, East Part, because of its relatively close proximity to the Los Angeles area, and its nearness to Death Valley and Mt. Whitney, provides a wide variety of outdoor recreational opportunities. The Ancient Bristlecone Area, with the oldest living trees in the world, is located within the survey area, and attracts many visitors each year. It is also an important grazing and mining area.

General Nature of the Area

This section briefly discusses the location, geomorphology, drainage, geology, climate, growing season and vegetation of the White Mountains, the Inyo Mountains and the Pizona area.

Location and Geomorphology

The survey area encompasses most of the White-Inyo Range, and the Pizona Area, and is 669,420 acres in size. The survey area does not include all of the Inyo National Forest lands.

The White-Inyo Range

The survey area includes all of the White-Inyo Range from about one and one-half miles north of Mt. Inyo in the south to about one mile north of Sugarloaf Mountain in the north.

The White-Inyo Range, made up of the White Mountains and the Inyo Mountains, forms the east wall of the Owens Valley, and is a single continuous chain 110 miles long. It is a typical Basin and Range Province range. The Inyo Mountains form the southern portion, and the White Mountains form the northern portion of the range. This range runs in a northwestward direction. "On the south, it is separated from the Coso Mountains by a broad depression, and on the north, it terminates in Mount Montgomery. Its western face slopes off abruptly toward the Owens Valley, and is but little less precipitous than that of the Sierra on the opposite side of the valley. Its western border is thus determined by the floor of the Owens Valley, and as a whole is remarkably straight. Its eastern border is not so sharply defined. In its northern part, it is marked by Fish Lake Valley, but between this valley and the Saline Valley to the south, there is an irregular mountainous area that is not clearly separated from the [White-] Inyo Range on the west nor from the ranges in the east. Still further south, the deep elliptical depression known as the Saline Valley, whose floor is 2,500 feet lower than that of the Owens Valley, separates the [White-] Inyo Range from the Ubehebe Range on the east. The flank of the [White-] Inyo Range here is exceedingly steep and rugged. In fact, it is fully comparable in height and precipitousness with the great escarpment of the Sierra Nevada" (8). Elevation ranges from about 4,000 feet in the footslopes of the southern part of the range to 14,242 feet at the crest of White Mountain Peak.

The White-Inyo Range acquired its present topographic form by faulting which occurred about 10 million years ago. Glaciation occurred in localized areas on the east side of the northern White Mountains within the last 1 million years.

Drainage of the area is accomplished by numerous intermittent and perennial creeks. The most important of these are Cottonwood Creek in the White Mountains, which flows into Fish Lake Valley; Birch, Wyman and Crooked Creeks, which flow into the Deep Springs Basin; Willow Creek, which flows into the Eureka Valley Basin; and Waucoba Wash, which feeds the Saline Valley during flash-flood periods.

The White-Inyo Range is the product of hundreds of millions of years of geologic evolution. It formed from a triangular fault block of sedimentary, granitic and metamorphic rock, with intrusions of volcanic flows. "Sedimentary rocks of the Paleozoic age predominate the [White-] Inyo Range" (9). These sedimentary rocks include sandstone, dolomite, limestone, shale, quartzite, calcareous sandstone, marine shale and conglomerates. About 150 million years ago, the beds of sedimentary rock were faulted and folded, and the region was then invaded by great masses of adamellite (granitic rock) and other associated rocks.

The Pizona Area

The Pizona area is located northwest of the northern end of the White Mountains. It is separated from the White-Inyo Range by Queen Valley at the Nevada-California state line. It includes Antelope Mountain, the Pizonas, Adobe Hills, and the lower portions of Anchorite Hills and the Excelsior Mountains. It is bounded by the Mono Lake Valley on the west side, Cowtrack Mountain in the southwest part, Adobe Valley in the south central portion, and Benton Valley and Queen Valley in the southeastern part. The northern border is the California-Nevada state line, except in the extreme eastern part. Here it is bounded by Truman Meadows and McBride Flat, both in Nevada. The area is mountainous, although not as precipitous as the White-Inyo Range. Elevation ranges from about 6,000 feet in some footslopes adjoining the valley floor, to about 8,200 feet along some of the tallest crests.

The Pizona area acquired its present topographic form by warping and faulting which occurred within the last million years. Prior to this warping and faulting, the surface produced by the basaltic eruptions was probably a lava plain of low relief and had some areas of older rock rising above it.

Drainage of the Pizona area is accomplished by numerous intermittent and perennial creeks. The most important of these is Adobe Creek in the Pizona area, which feeds the Adobe Valley Basin.

The Pizona area formed from nonmetamorphosed andesite and rhyolite flows; sediments, mainly tuffaceous silts, sands and diatomites; and sheetlike flows of olivine basalt. The latter cover nearly the entire area, and are a result of numerous eruptions at a number of different centers over a wide area east and south of the Mono Basin.

Climate

The climate in both the Pizona area and the White-Inyo Range generally is characterized as a transition between the Mediterranean climate of the West Coast, and the Continental climate of New Mexico to the east. Winters are cool and summers are warm. The area generally receives precipitation the year round, but the majority of the moisture comes in the winter months, usually in the form of snow. Summer precipitation consists of intermittent rain showers.

The White-Inyo Range

The average annual precipitation ranges from 4 inches in the southern part to 20 inches in the northern part of the range. Precipitation is low because the moisture-laden winds from the Pacific Ocean are largely robbed of their moisture by the Sierra Nevada, before they reach the White-Inyo Range. "This is notably true in the southern part of the range, which is opposite the highest part of the Sierra Nevada. North of Bishop, however, the [White-] Inyo Range averages nearly as high as the Sierra opposite it" (8).

The Pizona Area

The average annual precipitation ranges from 8 to 12 inches. Precipitation is low because moisture-laden winds are robbed of their moisture by the Sierra Nevada, before they reach the Pizona Area.

The Growing Season

The growing season for the Pizona area and the White-Inyo Range varies by elevation. In the lower elevations, the season is during the summer and autumn months. At mid elevations, the season generally is confined to the summer months. The upper elevations have an extremely short growing season, lasting only from late June to early July. The length of the growing season for each zone in the area is as follows:

Desert Transition Zone	: 4 to 6 months
Montane Zone	: 2 to 3 months
High Montane Zone	: 2 to 5 weeks
Alpine Zone	: 1 to 4 weeks

Vegetation

The plant communities used in this report are based on the "Vegetation Classification System for Southern California" (3). The following is a list of the plant communities in the survey area and the plant series that may be in each plant community. The plant names are based on "CALVEG, A Classification of California Vegetation" (2). All of the series given for a plant community may not be on a specific site under that community.

Desert Shrub Community - the plant series in this community are Nevada Ephedra (*Ephedra Nevadensis*), Shadscale (*Artiplex confertifolia*), Spiny Mendora (*Mendora spinescens*), Fourwing Saltbrush (*Atriplex canescens*), Greenfire (*Mendora* sp.), Boxthorn (*Lycium*) and Buckwheat (*Eriogonum* sp.).

Pinon Pine - Juniper Woodland Community - the plant series in this community are Pinon Pine (*Pinus monophylla*), Utah Juniper (*Juniperus* sp.), Mountain Mahogany (*Cercocarpus ledifolius*), Big Sagebrush (*Artemisia tridentata*), Black Sagebrush (*Artemisia arbuscula nova*), Low Sagebrush (*Artemisia arbuscula*), Antelope Bitterbrush (*Purshia tridentata*), Rabbitbrush (*Chrysothamnus* sp.), Goldenbush (*Haplopappus* sp.), Mormon Tea (*Ephedra fasciculata*), Wheatgrass (*Agropyron* sp.) and Squirreltail Grass (*Sitanion* sp.).

Bristlecone Pine Community - the plant series in this community are Bristlecone Pine (*Pinus aristata*), Limberpine (*Pinus flexilis*), Big Sagebrush (*Artemisia tridentata*), Lupine (*Lupinus* sp.), Buckwheat (*Eriogonum* sp.) and Bluegrass (*Poa* sp.).

Dwarf Scrub (Alpine) Community (Cushion Plants) - the plant series in this community are Goldenbush (*Haplopappus* sp.), Low Phlox (*Phlox*

hoodii), *Carex* (*Carex* sp.), Mat Eriogonum (*Eriogonum caespitosum*), Buckwheat (*Eriogonum* sp.) and Pringle Bluegrass (*Poa pringlei*).

Montane Meadow Community - the plant series in this community are Silver Sagebrush (*Artemisia cana*), *Carex* (*Carex* sp.) and *Juncus* (*Juncus* sp.).

Montane Sandy Community - the plant series in this community are Big Sagebrush (*Artemisia tridentata*), Antelope Bitterbrush (*Purshia tridentata*) and Indian Ricegrass (*Oryzopsis hymenoides*).

The White-Inyo Range

The White-Inyo Range supports a wide variety of vegetation, from high desert to alpine type. Sagebrush and desert-type bushy plants dominate the lower elevations. The mid elevations support scattered pinon and juniper, with an understory of sagebrush and bitterbrush. The upper elevations support scattered stands of mountain mahogany, limberpine and Bristlecone pine. Open areas are dominated by mountain sagebrush. The dolomite and limestone areas of the White Mountains, in the Ancient Bristlecone Pine Area, support a nearly continuous Bristlecone pine forest, with little or no understory. The uppermost elevations of the range, at elevations above 13,000 feet, support herbs, grasses and other low-growing plants such as goldenbush, buckwheat and bluegrass.

The Pizona Area

The vegetation in the Pizona Area is highly mixed, due to deposition of wind-carried sands throughout the area. Areas bordering the valley floor support big sagebrush. The uplands support scattered pinon and juniper stands, with an understory of big sagebrush. Upland flats, and areas in canyons and depressions, where wind-blown sands from the Mono Basin have accumulated, support big sagebrush and bitterbrush.

How This Survey Was Made

This is an Order 3 soil survey. It has followed the directives and guidelines in the Forest Service Manual and Handbooks and the concepts, procedures, and guidelines of the National Cooperative Soil Survey as specified in the Soil Survey Manual (6), the National Soils Handbook (5,11), and the soil classification system as stated in Soil Taxonomy (7).

Soil Scientists began the inventory by collecting, studying, and correlating soil genesis and morphology data, including lithological, geomorphological, topographical, climatic, vegetative data for the soil survey area and for adjoining areas.

This data and information were 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 photograph field sheets (stereo-pair coverage) in hand, a reconnaissance study of the survey area was made. The delineations on the schematic map were 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 ensure that later recognition by photograph interpretation would be credible. Lithologic, geomorphic, soil, and vegetative characteristics were recorded in field notes, on the schematic map, and on the aerial photograph field sheets.

Using the augmented and corrected schematic map, field notes, and an understanding of how the photograph images relate to actual conditions on the ground, the soil scientists 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 photograph interpretation. The aerial photographs with the delineated map units and delineation symbols became the exploratory or preliminary soils map.

With the aerial photographs (exploratory soils maps) and a field stereoscope, the soil scientists examined on the ground as many delineations of each map unit as was possible, considering limited access in places and the time allowed to complete the survey. Map units were examined, studied, and described by aerial photograph interpretations and on-the-ground investigations.

Because the survey is Order 4 in intensity (12), and because of the time allotted for its completion, not every delineation of each map unit was visited and examined on the ground. Few delineations with no easy access were visited, but they were scrutinized by aerial photograph interpretation. Possibly one-third to one-half of the delineations on the field sheets and maps were not examined on the ground. Consequently, the data in this report are not suitable for project planning without field verification.

At each site that was visited and examined, individual soils were studied, named, described and classified, and enough data were collected 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 in most places consist of a group of soils on a particular landscape that has been delineated on the aerial photograph 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 a consociation, an association or a complex. The soil scientists made a field study and aerial photograph examination to estimate the percentage of each soil component in each map unit. The map units do not necessarily consist of similar soils. They consist of geographically associated soils that may be, and in places are, quite different in their characteristics and their suitability for use and management. For this reason also, the data in this report are not suitable for project planning without field verification.

The interpretations and predictions concerning use and management in this report are based on the soil scientists' knowledge and understanding of the conditions recognized and measured in the field. In classifying the soils, soil scientists can also, with acceptable reliability, bring information concerning use and management of a particular soil from other survey areas where the same soil occurs and has been recognized and studied. Some use and management interpretations and predictions should be considered as first or second approximations owing to the relatively few examinations and measurements that were made. This is still another reason that limits the data in this survey for project planning without field verification.

Despite the cautions that have been given concerning the use of data in this survey for project planning, the survey is adequate and reliable for its intended and designed purpose: a base for a forestwide system of land management planning.

General Soil Map Units

The general soil map shows map units which consist of many individual soils. Each map unit contains soils 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 family level or at a higher taxonomic level.

Soils of the Alluvial Plains - Moderate and Cool Soil Temperatures

Material from Granitic Rocks

1. Berent - Preston - Bluewing families

This map unit is in alluvial depressions and on sand dunes. Slope is 1 to 60 percent. Elevation is 3,800 to 8,000 feet. The mean annual precipitation is 6 to 10 inches. The typical vegetation is big sagebrush and antelope bitterbrush. This unit comprises 2 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of Typic Xerorthents, and the Trocken and Finley families.

Material from Other Rocks or Mixed Rocks

2. Mackey - Unionville - Wrango families

This map unit is on alluvial fans and terraces. Slope is 2 to 70 percent. Elevation is 3,800 to 8,500 feet. The mean annual precipitation is 6 to 11 inches. The typical vegetation is big sagebrush, goldenbush and Nevada Ephedra. This unit comprises 3 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of Abgese, Trocken and Berent families.

3. Spanel - Trocken - Gol families

This map unit is on stable alluvial fans and terraces. Slope is 2 to 60 percent. Elevation is 3,800 to 10,100 feet. The mean annual precipitation is 6 to 10 inches. The typical vegetation is Mormon Tea, shadscale and boxthorn. This unit comprises 3 percent of the survey area. The above-named components comprise most of

the unit, but there are also minor areas of the Bluewing family and Durargidic Argixerolls.

Soils of the Temperate Uplands - Moderate and Cool Temperatures

Volcanic Soil Parent Material

4. Rock outcrop, volcanic - Risue - Toeja families

This map unit is on lava flows and mountains. Slope is 1 to 80 percent. Elevation is 5,100 to 10,000 feet. The mean annual precipitation is 8 to 12 inches. The typical vegetation is big sagebrush, singleleaf pinyon pine, curl-leaf mountain mahogany and antelope bitterbrush. This unit comprises 13 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of the Abgese, Preston, Merlin, Tweedy, Unionville, Berent, Bearskin, Credo, Wenzel, Berning, St. Marys and Simpson families.

Limestone, Dolomite or Marble Soil Parent Material

5. Rock outcrop, limestone - Theriot - Sanpete families

This map unit is on colluvial and residual positions on mountains, in the Inyo Mountains. Slope is 2 to 80 percent. Elevation is 4,100 to 8,500 feet. The mean annual precipitation is 6 to 9 inches. The typical vegetation is shadscale, greenfire and boxthorn. This unit comprises 10 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of Lithic Camborthids.

6. Rock outcrop, limestone - Hymas - Beveridge families

This map unit is on colluvial and residual positions on mountainsides, in the White Mountains. Slope is 15 to 80 percent. Elevation is 5,600 to 11,700 feet. The mean annual precipitation is 10 to 11 inches. The typical vegetation is singleleaf pinyon pine and juniper. This unit comprises 6 percent of the survey area. The above-named components comprise most of the unit, but there are also minor areas of the Swift Creek family.

Plutonic and Noncarbonate Sedimentary and Metamorphic Rock Soil Parent Materials

7. Rock outcrop, granitic - Washoe - Mexispring families

This map unit is on colluvial and alluvial positions on lower mountains, at elevations of 8,500 feet or less. Slope is 2 to 80 percent. Elevation is 3,800 to 8,500 feet. The mean annual precipitation is 6 to 10 inches. The typical vegetation is big sagebrush, singleleaf pinyon pine and Mormon Tea. This unit comprises 16 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of the Mulett, Yuko, Checkett, Trocken, Finley, Midas, Moano, Mackey, Cath and Blackston families.

8. Rock outcrop, granitic - Hartig - Basket families

This map unit is on colluvial and alluvial positions on mid-mountains, at elevations of 12,700 feet or less. Slope is 5 to 80 percent. Elevation is 5,800 to 12,700 feet. The mean annual precipitation is 8 to 12 inches. The typical vegetation is singleleaf pinyon pine, big sagebrush, antelope bitterbrush and curleaf mountain mahogany. This unit comprises 36 percent of the survey

area. The above-named components comprise most of the unit, but there are also significant areas of the Dunul, Slinger, Bregar, Soakpak, Packham, Brad, Bondbranch, Spaa, Mascamp, Sumine, Simpson and Vipont families, and Typic Haplargids.

*Soils of the Cold Uplands -
Cold Soil Temperatures*

Plutonic, Sedimentary and Metamorphic Rock Soil Materials

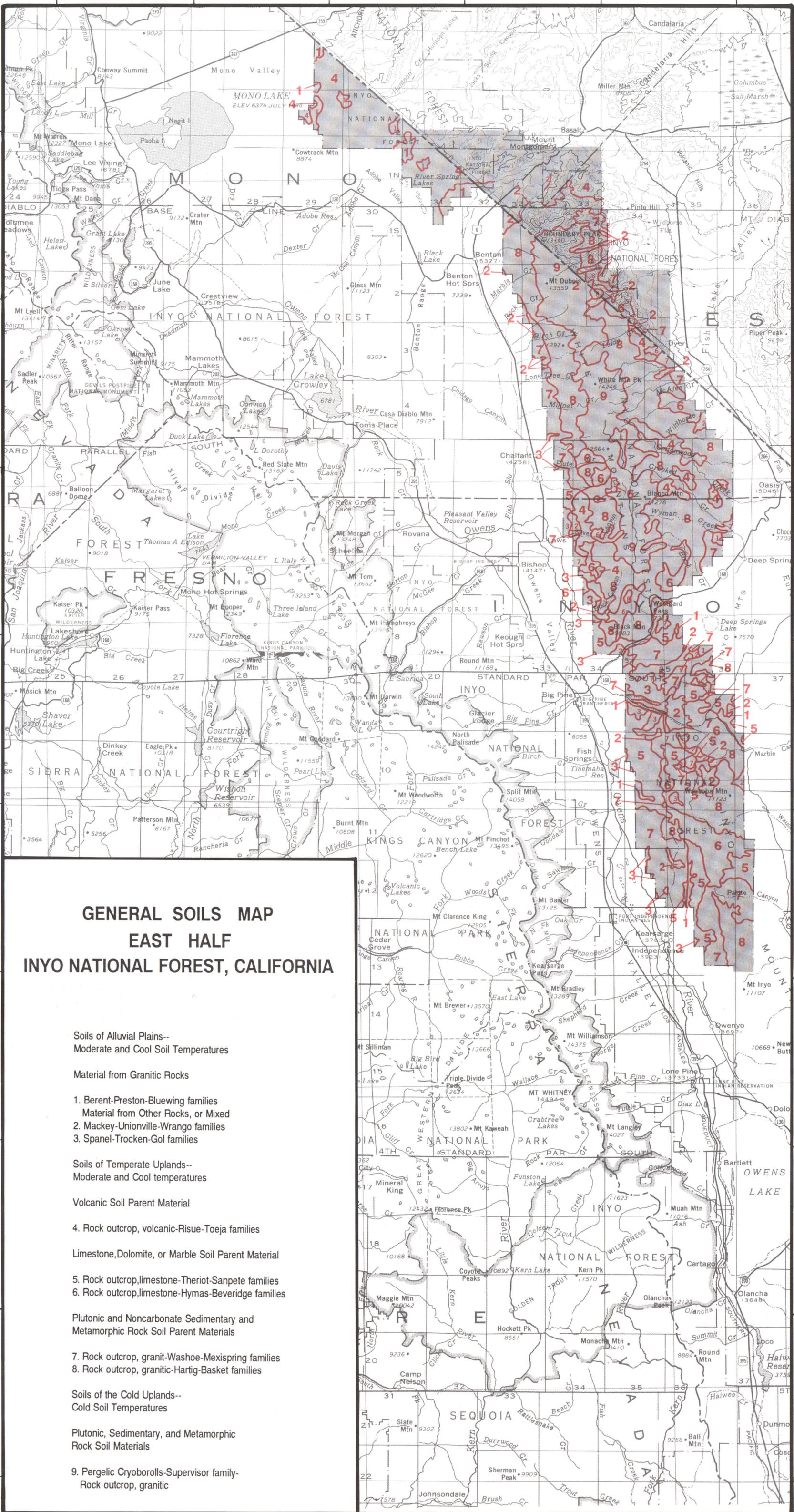
9. Pergelic Cryoborolls - Supervisor family - Rock outcrop, granitic

This map unit is on colluvial and alluvial positions on high mountains, at elevations greater than 8,800 feet. Slope is 5 to 80 percent. Elevation is 8,800 to 14,250 feet. The mean annual precipitation is 11 to 18 inches. The typical vegetation is goldenbush, mat eriogonum, bluegrass, lupine and Bristlecone Pine. This unit comprises 11 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of the Soakpak and Bartine families.

119°15' 119°00' 118°45' 118°30' 118°15' 118°00'

38°00' 37°45' 37°30' 37°15' 37°00' 36°45' 36°30' 36°15' 36°00'

38°00' 37°45' 37°30' 37°15' 37°00' 36°45' 36°30' 36°15' 36°00'



**GENERAL SOILS MAP
EAST HALF
INYO NATIONAL FOREST, CALIFORNIA**

Soils of Alluvial Plains--
Moderate and Cool Soil Temperatures

Material from Granitic Rocks

1. Berent-Preston-Bluwing families
Material from Other Rocks, or Mixed
2. Mackey-Unionville-Wrango families
3. Spanel-Trocken-Gol families

Soils of Temperate Uplands--
Moderate and Cool temperatures

Volcanic Soil Parent Material

4. Rock outcrop, volcanic-Risue-Toeja families

Limestone, Dolomite, or Marble Soil Parent Material

5. Rock outcrop, limestone-Theriot-Sanpete families
6. Rock outcrop, limestone-Hymas-Beveridge families

Plutonic and Noncarbonate Sedimentary and
Metamorphic Rock Soil Parent Materials

7. Rock outcrop, granit-Washoe-Mexispring families
8. Rock outcrop, granitic-Hartig-Basket families

Soils of the Cold Uplands--
Cold Soil Temperatures

Plutonic, Sedimentary, and Metamorphic
Rock Soil Materials

9. Pergelic Cryoborolls-Supervisor family-
Rock outcrop, granitic

Detailed Soil Map Units

The map units on the soil maps at the back of this report show the kind of soils in the survey area. Table 2 gives the acreage and proportionate extent of each map unit. Each map unit on the soil maps represents an area on the landscape and consists of one or more soils or miscellaneous landtypes for which the unit is named. The map unit descriptions and management interpretations, which are in tabular format, 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 needs for those uses.

In this survey, the individual soils (components of map units) were recognized and classified to families or phases of families or to the subgroup level (see "Classification of the Soils"). Soils that have profiles somewhat alike make up a soil family. Soil families are established within a subgroup primarily on the basis of physical and chemical properties that affect use and management. Soils of a family can also differ in slope, wetness, or degree of erosion, and because of such differences, a family is divided into soil phases.

Many map units are made up of two or more major soils. Table 1 lists for each soil, those map units in which the soil occurs as a major component. It also lists where each soil occurs as a named inclusion to a map unit. These map units are called soil complexes or soil associations. A soil complex consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. A soil association is made up of two or more geographically associated soils that are shown as one unit on the maps.

Because of present or anticipated uses, it was considered impractical to map the soils separately. In addition, some map units include miscellaneous areas as components. Rock outcrop is an example; it has little or no soil and supports little or no vegetation.

Definitions and Criteria - Soil Map Unit Descriptions and Soil Properties

The following are explanations of entries used in detailed soil map unit descriptions.

Map unit symbol and name. A numerical symbol is used to designate areas of each map unit on the soil maps. The symbol corresponds to the symbol preceding the map unit name in the map unit descriptions. The map unit consists of soil components or miscellaneous areas or both.

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

Annual precipitation. The average annual precipitation (in inches) for the map unit.

Soil Map unit components consist mostly of soil families but may include subgroups or higher soil taxa and miscellaneous land types.

Approximate proportion is the approximate percentage of each soil component or miscellaneous land type making up the map unit.

Landscape position describes the type of landform or surface on which the components are found.

Slope is the slope range for each soil component, expressed in percent slope.

Typical vegetation is the vegetation typically found in each of the soil components of the map unit.

Soil profile description is an abridged version of the more detailed soil profile descriptions in the section "Taxonomic Unit Descriptions". This description combines horizons and includes the thickness, dry color, texture, structure, rock fragment content and reaction (pH). Miscellaneous landtypes are also described here. Included are the following layers:

Surface Layer. The uppermost part of the soil, ordinarily removed in tillage, or its equivalent in uncultivated soils. Frequently designated the "A horizon".

Subsoil. The soil between the surface layer and the uppermost substratum. The subsoil consists of all parts of the B horizon above a depth of 2 meters (80 inches) and any part of the A or C horizon between the surface layer and a depth of 1 meter (40 inches) or a more shallow substratum.

Substratum. A layer below a depth of 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 part of the solum below two meters (80 inches) is considered substratum. Bedrock, hardpan, and unconsolidated geologic materials that are in contrasting particle-size classes relative to the surface soil or solum are substratum regardless of depth, even within one meter of the ground surface.

Restrictive Layer Depth is a restrictive layer which occurs within the upper 60 inches of the soil profile. Re-

restrictive layers impede or stop downward water movement and root penetration. Types of restrictive layers used in this report are:

- DP – Duripan or Hardpan
- FB – Fractured bedrock
- HB – Hard, unfractured bedrock
- PARA – Paralithic contact (bedrock)

Effective rooting depth is the range of depth that the main body of plant roots extend to, generally to shallow bedrock or to a maximum depth of 60 inches. Other limiting layers include hardpans, claypans, or weathered bedrock.

Available water capacity (AWC) is the capacity of the soil to store water for use by most plants. It commonly is defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is expressed as total inches of water within the effective rooting depth or to a depth of 60 inches. The following four classes of AWC are used in this survey:

Very low	0 to 2 inches
Low	2 to 4 inches
Moderate	4 to 8 inches
High	more than 8 inches

Water retention class is based on the available water capacity for plants of a typical soil profile to a depth of 20 inches or to bedrock, whichever is less. This moisture content is used in evaluating soils for revegetation according to the probability of survival of seedlings.

There are three water retention classes. The soils in class 1 have an available water capacity of more than 2.4 inches. Plantings on these soils have a high probability of survival. The soils in class 2 have an available water capacity of 1.2 to 2.4 inches. Some problems will be encountered in establishing plantings. The soils in class 3 have an available water capacity of less than 1.2 inch. Plantings on these soils have little chance of success unless intensive management or mitigation measures are applied.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned one of four groups. The soils are grouped according to the intake of water when they are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Low runoff potential. Soils having high rates of infiltration and water transmission when wet. They are mostly deep, well drained to excessively drained sands and gravel.

Group B. Moderately low runoff potential. Soils having moderate rates of infiltration and water transmission when wet. They are mostly moderately deep and deep, moderately well drained and well drained soils, moderately fine to moderately coarse textured and have moderately slow to moderately rapid permeability.

Group C. Moderately high runoff potential. Soils having slow rates of infiltration and water transmission when wet. They belong mostly to one of two categories. Those in the first category are mostly well drained and moderately well drained soils that have a slowly or very slowly permeable layer (such as claypan or hardpan or massive bedrock) at moderate depth (20-40 inches). Those soils in the second category generally have moderately fine or fine textures or a moderately high water table and may be somewhat poorly drained. This group also includes shallow soils over hard but highly fractured bedrock that allows moderate water transmission.

Group D. High runoff potential. Soils having very slow rates of infiltration and water transmission when wet. They are mostly fine-textured soils that have high shrink-swell potential, soils that have a permanently high water table, soils that have a claypan or a clay layer near the surface, or shallow soils over impervious material.

Permeability is the quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. The measure here is based on the least pervious soil horizon. Terms describing permeability are: Very slow (less than 0.06 inch), slow (0.06 to 0.20 inches), moderately slow (0.2 to 0.6 inches), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20.0 inches), and very rapid (more than 20.0 inches).

Drainage class refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation, but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized.

Excessively drained. Water is removed from the soil very rapidly. Excessively drained soils commonly are 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 commonly are 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. The soils commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

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

Poorly drained. Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, or nearly continuous rainfall, or a combination of these.

Very poorly drained. Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Very poorly drained soils commonly are level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Runoff classes are used to estimate the relative speed at which water, in the form of precipitation or run-on from an adjacent area flows over the soil surface without infiltrating. The rate and amount of runoff are determined by internal and external characteristics

of the soil and by climate and plant cover. Runoff can be significantly different on a soil under natural cover, under cultivation, and under different kinds of management. Differences in runoff can also be caused by differences in topography. Rainfall intensity influences runoff. Soils may have a high rate of runoff when frozen.

The six classes of runoff are:

Ponded. Little of the precipitation and run-on escapes as runoff, and free water stands on the surface for significant periods. The amount of water that must be removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level to nearly level depressional soils, and water depth may fluctuate greatly.

Very Slow. Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils commonly are level or nearly level or are very open and porous.

Slow. Surface water flows away slowly enough that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium. Surface water flows away fast enough that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid. Surface water flows away fast enough that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate to slow rates of absorption.

Very Rapid. Surface water flows away so fast that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

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 (10) 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, nor 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.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on the percentage of silt, sand and organic matter (up to 4 percent) and on the soil structure and permeability. Values of K in the survey area range from 0.02 to 0.43. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

T - Value is the maximum rate of soil erosion, whether from rainfall or wind, which will permit a high level of plant productivity to be sustained economically and indefinitely. It is expressed in tons per acre per year or in inches per year loss:

Tons/Acre/Year	Inches/Year
1	0.0064
2	0.0128
3	0.0192
4	0.0256
5	0.0320

Wind Erodability Group (WEG) is the susceptibility of the surface of the soil to erosion by wind. It is related to the percentage of dry, non-erodible soil aggregates greater than 0.84 mm in diameter. The following table is a general guide for determining WEG:

WEG	Adjective Rating	Texture of Surface Inch of Soil
1	High	Very fine sand, fine sand and medium sand
2	High	Loamy sand, loamy fine sand
3	Moderate	Very fine sandy loam, fines sandy loam and sandy loam.
4	Low	Clay, silty clay, noncalcareous clay loam, and silty clay loam with more than 35% clay.
4L	Moderate	Calcareous loam and silt loam; calcareous clay loam and silty clay loam with less than 35% clay content.
5	Low	Noncalcareous loam and silt loam with less than 20% clay content; sandy clay loam, sandy clay.
6	Low	Noncalcareous loam and silt loam with more than 20% clay content; noncalcareous clay loam with less than 35% clay content.
7	Low	Very wet or stony; not subject to wind erosion.

Included Areas comprise the other kinds of soils in the map unit that are not named as a component part because they constitute too small a percentage of the unit. Included areas are given because some do affect management significantly and the recognition of all of them will assist with more detailed mapping in the future.

Remarks are comments that are unique to the particular map unit, important to the management of the map unit, or they add further explanation to something previously stated in this section.

Definitions and Criteria - Soil Map Unit Management Interpretations

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

Soil manageability classes are ratings that are applied to the individual components of a soil map unit. Manageability classes are useful for providing specific information about individual soils. Because map units may contain soils with contrasting class ratings, soil manageability groups are used to provide general ratings that

apply to an entire map unit. Manageability groups are useful for providing general information for large areas.

Soil manageability classes are represented by the numerals 1 to 4. Class 1 is the easiest to manage and class 4 is the most difficult. Letter symbols are added to classes 2, 3, and 4 to identify specific soil problems affecting management. Soil manageability classes are described as follows:

Class 1 - Easy to manage. Soils in this class are on stable slopes with gradients ranging up to about 30 percent. They are moderately deep or deep and do not have more than slight management problems. No management option modifiers apply to this class.

Class 2 - Readily manageable. Soils in this class are mostly on slopes of less than 30 percent and have one or more moderate management limitations, such as a moderate erosion hazard.

Class 3 - Moderately difficult to manage. Soils in this class are on steep slopes that are mostly between 30 and 60 percent, or they have a major management limitation, or both.

Class 4 - Very difficult to manage. Soils in this class are on very steep slopes (more than 60 percent),

or they have two or more other major management limitations.

Letter symbols are used to express the severity of potential problems in soil management. Major manage-

ment option modifiers are identified by capital letters and moderate management modifiers are indicated by lowercase letters. The criteria and symbols for management option modifiers for each soil characteristic or topographic feature are listed in table 1.

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
Slope stability	S ... Low	s ... Moderate
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 area	x ... 3 to 15 percent of surface area

Management option modifiers are chosen in the order in which they are listed. One symbol can be chosen from each of the following groups: (1) symbols G, S, and E (and their lower case forms); (2) symbols D and P; and (3) symbols W and X. Within each group, symbols for major management limitations take precedence over moderate limitations.

Soil manageability groups are defined by the mix of soil manageability classes that occurs in a soil map unit. They are designated by Roman numerals to distinguish them from soil manageability classes. Only one group applies to a soil map unit, whereas as many classes may apply as there are major components in the map unit. The soil manageability groups in the survey area are defined as follows:

Group I - Map unit is predominantly class 1. Less

than 20 percent of the unit is class 3 or class 4. The unit may be no more than 50 percent class 2, or combinations of classes 2, 3, and 4.

Group II - Map unit is predominantly class 2. Less than 20 percent of the unit is class 4. Less than 50 percent of the unit is class 3 or a combination of classes 3 and 4.

Group III - Map unit is predominantly class 3. Less than 40 percent of the unit is class 4.

Group IV - Map unit is at least 40 percent class 4.

A soil map unit is placed in the group with the lowest numeral if group definitions allow the unit to be placed in more than one soil manageability group.

Range Interpretations

Range Productivity is an estimate of the total annual production of forage grasses in pounds per acre (air-dry weight). The estimates generally are based on professional judgement because little if any field data or yield studies were available. These estimates can be verified through project monitoring activities and ecosystem classification.

Range Suitability is the suitability of a unit for grazing. The suitability for range is indicated by summer-autumn, summer and unsuitable. A rating of summer-autumn means that soils are capable of producing forage for grazing in the summer and autumn. A rating of summer means that the soils are capable of producing forage in the summer. A rating of unsuitable means that the unit is not capable of producing forage.

Most Limiting Factors - The "most limiting factors" for use as range are listed for units suited to range. If the unit is used for range, "Rock outcrop" indicates the percent of non-productive land; "shallow soils" indicates the percent of soils that are less than 20 inches deep; "plant competition" indicates that forage generally has to compete with trees and non-palatable 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.

Recreation Interpretations

Limitations for Camp Areas, Picnic Areas and Paths and Trails - The suitability for recreational purposes is indicated by "slight", "moderate" or "severe" restrictions. The object of the ratings is not to dictate management decisions for an area, but rather, to show what factors, if any, must be overcome in utilizing these areas for recreational uses. Restrictive features are listed for severe and moderate ratings. Only the most restrictive features are listed. Lesser restrictive features are also important, and should be identified and addressed.

Soils are rated in their "natural" state. That is, no unusual modification of the soil site or material is made other than that which is considered normal practice for the rated use.

"Slight" is the rating given soils that have properties favorable for the use. The degree of limitation is minor and can easily be overcome. Good performance and low maintenance can be expected.

"Moderate" is the rating given soils that have properties moderately favorable for use. This degree of limitation

can be overcome or modified by special planning, design or maintenance. During some part of the year, the expected performance of the structure or other planned use is somewhat less desirable than for soils rated slight. Some soils rated moderate require treatment such as artificial drainage, control of runoff to reduce erosion, extended septic tank absorption fields, extra excavation, or some modification of certain features through the manipulation of the soil. For these soils, modification is needed for those construction plans generally used for soils of slight limitation. Modification may include specially designed foundations, extra reinforcement of structures, sump pumps and the like.

"Severe" is the rating given soils that have one or more properties unfavorable for the rated use, such as steep slopes, bedrock near the surface, flooding, high shrink-swell potential, a seasonal high water table or low strength. This degree of limitation generally requires major soil reclamation, special design or intensive maintenance. Some of these soils, however, can be improved by reducing or removing the soil feature that limits its use, but in most situations, it is difficult and costly to alter the soil or to design a structure so as to compensate for a severe degree of limitation.

The restrictive features for the survey area are:

Depth to Rock - Applied only to Camp Area interpretations, as applicable. Soils less than 10 inches deep are rated severe. Soils 10 inches or deeper do not adversely restrict this use.

Large Stones - Applies to all of the recreation uses listed. Large stones are rock fragments which are greater than 3 inches in diameter.

Slope - Slope group restrictions are used in all of the interpretations. Severity of restriction increases with increasing percent slope.

Small Stones - This restriction modifier is used in all recreation interpretations, where applicable. Small stones are 0.8 to 3 inches in diameter.

Too Clayey - This restriction is used in all recreation interpretations, as applicable. Soil surface types considered restrictive are sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay and clay textures.

Too Sandy - This restriction modifier is used in all recreation interpretations, as applicable. Soil surface types considered restrictive are loamy coarse sand, loamy sand, loamy fine sand, very fine sand, coarse sand, sand and fine sand.

Engineering Interpretations

Engineering Soil Classification - There are several engineering soil classification systems. This report uses the two most common ones:

Unified Soil Classification or ASTM (American Society for Testing Materials) is a system that classifies soil according to those properties that affect their use as construction material. This system was developed by Arthur Casagrande and modified by the Bureau of Reclamation and the Army Corps of Engineers so that it now applies to embankments and foundations, as well as to roads and air fields. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, and according to the 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 are identified as ML, CL, OL, MH, CH, and OH. Highly organic soils are identified as Pt. Soils exhibiting engineering properties of two groups can have a dual classification (for example, SW-SM).

AASHO Soil Classification (American Association of State Highway Officials) is a system that classifies soil according to those properties that affect their use in highway construction and maintenance. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, and according to the plasticity index and the liquid limit. Sandy, stony and gravelly soils are identified as A-1-a and A-1-b. Fine sands are identified as A-3. Silty or clayey gravel and sand are identified as A-2-4, A-2-5, A-2-6 and A-2-7. Silty soils are identified as A-4 and A-5. Clayey soils are identified as A-7-5 and A-7-6. Soils exhibiting engineering properties of more than one group can have more than one classification.

Soil Suitability for Selected Engineering Uses

- The suitability for selected engineering purposes is indicated by "good", "fair" or "poor". An additional rating of "unsuited" is also used for rating an area as a source of sand. Soils are rated in their "natural" state. That is, no unusual modifications of the soil site or materials are made other than that which is normal practice for the rated use.

A rating of *good* means that the soils have properties favorable for the intended use. Good performance and low maintenance can be expected.

A rating of *fair* means that the soil is moderately favorable for the intended use. One or more soil properties make these soils less desirable than those rated good.

A rating of *poor* means that the soil has one or more properties unfavorable for the intended use. Overcoming the unfavorable property requires special design, extra maintenance or costly alteration.

A rating of *unsuited* means that the expected performance of the soil would be unacceptable for the intended use.

The restrictive features for engineering in the survey area are:

Area Reclaim - This is an area which is difficult to reclaim after the removal of soil materials for construction or other uses. Revegetation and erosion control are extremely difficult. This feature is based on soil depth, and applies to interpretations for Topsoil and Roadfill.

Excess fines - This is an area in which the soils have excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Low Strength - This is an area in which the soils have inadequate strength for supporting loads. This restriction applies only to interpretations for Roadfill.

Large Stones - This applies to all engineering uses addressed in Management Interpretations section of this report. Large stones are rock fragments which are greater than 3 inches in diameter.

Slope - Slope group restrictions are used only in interpretations for Topsoil and Roadfill. The severity of the restriction increases with an increase in slope.

Small Stones - This restriction modifier applies only to interpretations for Topsoil, where applicable. Small stones are 0.8 to 3.0 inches (2.0 to 7.6 cm.) in diameter.

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101 - Abgese - Berent - Mackey families complex, 2 to 15 percent slopes

Elevation: 5,100 to 9,050 feet Annual Precipitation: 10 inches

Soil Map Unit Components	Abgese family	Berent family	Mackey family
Approx Proportion	35 percent	20 percent	15 percent
Landscape Position	Crests and sideslopes of alluvial fans	Drainages and sandy washes	Modern drainages
Slope	2 to 5 percent	2 to 15 percent	2 to 15 percent
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Singleleaf Pinyon Pine (<i>Pinus monophylla</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Goldenbush (<i>Haplopappus</i> spp.)

Soil Profile Description

Surface Layer	0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline	0 to 13 inches; pale brown and brown loamy sand and gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline	0 to 3 inches; brown gravelly sandy loam; weak fine granular structure; mildly alkaline
Subsoil	5 to 16 inches; yellowish brown sandy loam and gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline	—	3 to 42 inches; brown and yellowish brown very gravelly sandy loam; weak medium subangular blocky structure & massive; none to slightly effervescent; mildly to moderately alkaline
Substratum	16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline	13 to 60 inches; pale brown and light yellowish brown loamy fine sand, medium sand and gravelly sandy loam; massive; moderately alkaline	42 to 60 inches; light brownish gray extremely gravelly loamy sand; massive; strongly effervescent, moderately alkaline

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	Greater than 60 inches	Greater than 60 inches
Effective Rooting Depth (inches)	40 to 60 inches	20 to 40 inches	20 to 40 inches
Available Water Capacity	Moderate (4.6 to 5.7 inches)	Low to Mod. (3.8 to 5.0 inches)	Low (2.7 to 3.6 inches)
Water Retention Class	2 (1.7 to 2.1 inches)	2 to 3 (1.1 to 1.6 inches)	2 (1.2 to 1.6 inches)
Hydrologic Soil Group	B	A	B
Permeability (in./hr.)	2.0 to 6.0	2.0 to 6.0	2.0 to 6.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Slow	Slow to Medium	Slow to Medium
Max Erosion Hazard	Moderate	High	High
Erosion Factor (k)			
Surface	0.15 (Low)	0.15 (Low)	0.05 (Low)
Subsurface	0.17 (Low)	0.10 (Low)	0.10 (Low)
T Value	3	4	4
Wind Erodability Group	3	2	3

101 - Abgese - Berent - Mackey families complex (continued)

Soil Manageability Group Class	III 2ep	III 3Ep	III 3Ep
Range Interpretations			
Productivity (lb/acre)	500 to 700	300 to 400	300 to 400
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; high erosion hazard	Plant competition; high erosion hazard	Plant competition; high erosion hazard
Recreation Interpretations - Limitations for			
Camp Areas	Slight	2-8% slopes: Moderate - Too sandy 8-15% slopes: Moderate - Too sandy; slope	2-8% slopes: Moderate - Small stones 8-15% slopes: Moderate - Small stones; slope
Picnic Areas	Slight	Severe: Too sandy	2-8% slopes: Moderate - Small stones 8-15% slopes: Moderate - Small stones; slope
Paths & Trails	Slight	Moderate: Too sandy	Moderate: Small stones
Engineering Interpretations			
Unified Class	SM-SC	SM; SW-SM	SM
Surface	SM-SC	—	SW-SM; SM-SC
Subsoil	SM	SM; SW-SM	GW-GM
Substratum			
AASHTO Class	A-2-4	A-2-4	A-1-b; A-2-4
Surface	A-2-4	—	A-1-a; A-1-b; A-2-4
Subsoil	A-1-b; A-2-4	A-2-4	A-1-a; A-1-b; A-2-4
Substratum			
Suitability for	Unsuited	Poor: Excess fines	Unsuited
Sand	Unsuited	Unsuited	Unsuited
Gravel	Fair: Small Stones	2-8% slopes: Fair - Too sandy.	Poor: Small stones
Topsoil		8-15% slopes: Fair - Slope; Too sandy	
Roadfill	Good	Good	Good

Included Areas & Remarks

Included in this map unit are small areas of the Berning and Midas families on old alluvial fans; and the Abgese, Berent and Mackey families in their respective landscape positions, but on 15 to 30 percent slopes. Included areas make up approximately 30 percent of the map unit area.

102 - Abgese - Berent - Toeja families association, 2 to 30 percent slopes

Elevation: 6,680 to 7,640 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Abgese family	Berent family	Toeja family
Approx Proportion	40 percent	25 percent	15 percent
Landscape Position	Southerly and westerly-facing sideslopes of basalt flows	Superimposed on valleys between basalt flows	Northerly and easterly-facing sideslopes of basalt flows
Slope	15 to 30 percent	2 to 15 percent	15 to 30 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Curlleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline	0 to 13 inches; pale brown & brown loamy sand & gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline	1 to 0 inch; Litter 0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline
Subsoil	5 to 16 inches; yellowish brown sandy loam & gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline		12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline
Substratum	16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline	13 to 60 inches; pale brown & light yellowish brown loamy fine sand, medium sand & gravelly sandy loam; massive; moderately alkaline	22 inches; weathered rhyolite (paralithic contact)

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	Greater than 60 inches	21 to 24 inches PARA
Effective Rooting Depth (inches)	40 to 60 inches	20 to 40 inches	21 to 24 inches
Available Water Capacity	Moderate (4.6 to 5.7 inches)	Low to Mod. (3.8 to 5.0 inches)	Low (2.4 to 3.4 inches)
Water Retention Class	2 (1.7 to 2.1 inches)	2 to 3 (1.1 to 1.6 inches)	1 to 2 (2.1 to 2.7 inches)
Hydrologic Soil Group	B	A	C
Permeability (in./hr.)	2.0 to 6.0	2.0 to 6.0	0.2 to 0.6
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid	Slow to Medium	Rapid
Max Erosion Hazard	Moderate to High	High	High
Erosion Factor (k)			
Surface	0.15 (Low)	0.15 (Low)	0.10 (Low)
Subsurface	0.17 (Low)	0.10 (Low)	0.28 (moderate)
T Value	3	4	2
Wind Erodability Group	3	2	8

102 - Abgese - Berent - Toeja families association (continued)

Soil Manageability
Group
Class

III
2epx

III
3Epx

III
3Ex

Range Interpretations

Productivity (lb/acre)

500 to 700

300 to 400

600 to 1000

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard

Plant competition; 10% rock outcrop; high erosion hazard

Plant competition; 10% rock outcrop; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

2-8% slopes:
Moderate - Too sandy
8-15% slopes:
Moderate - Too sandy;
slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Too Sandy

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - Slope
25-30% slopes:
Severe - Slope

Moderate: Too Sandy

15-25% slopes:
Moderate - Slope; large stones
25-30% slopes:
Severe - Slope

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

SM-SC
SM-SC
SM

SM, SW-SM
—
SM; SW-SM

SM
SM
—

AASHTO Class
Surface
Subsoil
Substratum

A-2-4
A-2-4
A-1-b; A-2-4

A-2-4
—
A-2-4

A-4
A-2-7
—

Suitability for
Sand
Gravel
Topsoil

Unsuited
Unsuited
Poor: Slope

Poor: Excess fines
Unsuited
2-8% slopes:
Fair - Too sandy
8-15% slopes:
Fair - slope; Too sandy

Poor: Excess fines
Unsuited
Poor: Slope; Small stones

Roadfill

15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope

Good

15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of basalt rock outcrop, on sideslopes of basalt flows; the Abgese and Berent families, 30 to 60 percent slopes, on mountainsides; and a soil similar to the Berent family, but less than 1 foot to the underlying Abgese and Toeja families, 15 to 30 percent slopes, on toeslopes. Included areas make up approximately 20 percent of the map unit area.

103 - Abgese - Berent- Toeja families associations, 30 to 70 percent slopes

Elevation: 6,640 to 7,530 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Abgese family	Berent family	Toeja family
Approx Proportion	35 percent	25 percent	20 percent
Landscape Position	Southerly and westerly-facing sideslopes of basalt flows	Superimposed in valleys between basalt flows	Northerly and easterly-facing sideslopes of basalt flows
Slope	30 to 70 percent	15 to 30 percent	30 to 70 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Curlleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline	0 to 13 inches; pale brown and brown loamy sand and gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline	1 to 0 inch, Litter 0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline
Subsoil	5 to 16 inches; yellowish brown sandy loam and gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline	—	12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline
Substratum	16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline	13 to 60 inches; pale brown and light yellowish brown loamy fine sand, medium sand and gravelly sandy loam; massive; moderately alkaline	22 inches; Weathered rhyolite (paralithic contact)

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	Greater than 60 inches	21 to 24 inches PARA
Effective Rooting Depth (inches)	40 to 60 inches	20 to 40 inches	21 to 24 inches
Available Water Capacity	Moderate (4.6 to 5.7 inches)	Low to Mod. (3.8 to 5.0 inches)	Low (2.4 to 3.4 inches)
Water Retention Class	2 (1.7 to 2.1 inches)	2 to 3 (1.1 to 1.6 inches)	1 to 2 (2.1 to 2.7 inches)
Hydrologic Soil Group	B	A	C
Permeability (in./hr.)	2.0 to 6.0	2.0 to 6.0	0.2 to 0.6
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid to very rapid	Rapid	Rapid to very rapid
Max Erosion Hazard	High	High	High to very high
Erosion Factor (k)			
Surface	0.15 (low)	0.15 (low)	0.10 (low)
Subsurface	0.17 (low)	0.10 (low)	0.28 (moderate)
T Value	3	4	2
Wind Erodability Group	3	2	8

103 - Abgese - Berent- Toeja families associations (continued)

Soil Manageability
Group
Class

III
3Egpx

III
3Epx

III
3Egx

Range Interpretations

Productivity (lb/acre)

500 to 700

300 to 400

600 to 1000

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope; Too sandy

Severe: Slope

Paths & Trails

Severe: Slope

15-25% slopes:
Moderate - slope; Too sandy
25-30% slopes:
Severe slope

Severe: Slope

Engineering Interpretations

Unified Class

Surface

SM-SC

SM; SW-SM

SM

Subsoil

SM-SC

—

SM

Substratum

SM

SM; SW-SM

—

AASHTO Class

Surface

A-2-4

A-2-4

A-4

Subsoil

A-2-4

—

A-2-7

Substratum

A-1-b; A-2-4

A-2-4

—

Suitability for

Sand

Unsuited

Poor: Excess fines

Poor: Excess fines

Gravel

Unsuited

Unsuited

Unsuited

Topsoil

Poor: Slope

Poor: Slope

Poor: Slope; Small stones

Roadfill

Poor: Slope

15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope

Poor: Slope; Area reclaim

Included Areas & Remarks

Included in this map unit are small areas of basalt rock outcrops and cinder cones on ridges and mountainsides; and soil similar to the Berent family, but less than 1 foot to underlying Abgese and Toeja families, 15 to 30 percent slopes, on toeslopes. Included areas make up approximately 20 percent of the map unit area.

104 - Basalt flow

Elevation:

Annual Precipitation:

Soil Map Unit
Components

—

Approx Proportion

—

Landscape Position

—

Slope

—

Typical Vegetation

—

Soil Profile Description

Surface Layer

Basalt flows consist of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants.

Subsoil

—

Substratum

—

Soil Properties

Restrictive Layer Depth

—

Effective Rooting
Depth (inches)

—

Available Water
Capacity

—

Water Retention Class

—

Hydrologic Soil Group

—

Permeability (in./hr.)

—

Drainage Class

—

Runoff

—

Max Erosion Hazard

—

Erosion Factor (k)

Surface

—

Subsurface

—

T Value

—

Wind Erodability
Group

—

104 - Basalt flow (continued)

Soil Manageability
Group —
Class —

Range Interpretations

Productivity (lb/acre) —
Suitability —
Most Limiting Factors —

Recreation Interpretations - Limitations for

Camp Areas —
Picnic Areas —
Paths & Trails —

Engineering Interpretations

Unified Class
Surface —
Subsoil —
Substratum —

AASHTO Class
Surface —
Subsoil —
Substratum —

Suitability for
Sand —
Gravel —
Topsoil —
Roadfill —

Included Areas & Remarks

105 - Basket - Bondranch families complex, 15 to 30 percent slopes

Elevation: 6,900 to 9,770 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Basket family

50 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus Monophylla*);
Big Sagebrush (*Artemisia tridentata*) Antelope
Bitterbrush (*Purshia tridentata*)

Bondranch family

30 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Mormon Tea (*Ephedra* spp.)

Soil Profile Description

Surface Layer

0 to 28 inches; pale brown very channery loam & fine sandy loam; weak very fine subangular blocky structure; neutral.

0 to 5 inches; pale brown very gravelly sandy loam & loam; weak fine, medium & coarse subangular blocky structure; neutral

Subsoil

28 to 57 inches; pale brown and light yellowish brown, extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral

5 to 16 inches; brown & yellowish brown gravelly loam, moderate medium subangular blocky structure; neutral.

Substratum

57 inches; hard metasedimentary bedrock

16 inches; hard metamorphosed cambrian marine bedrock

Soil Properties

Restrictive Layer Depth

25 to 57 inches HB

12 to 20 inches HB

Effective Rooting Depth (inches)

40 to 57 inches

12 to 20 inches

Available Water Capacity

Very low to low (1.2 to 3.4 inches)

Very low to low (1.2 to 2.7 inches)

Water Retention Class

2 (1.2 to 1.5 inches)

1 to 2 (1.2 to 2.7 inches)

Hydrologic Soil Group

B

D

Permeability (in./hr.)

0.2 to 0.6

0.6 to 2.0

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate to High

High

Erosion Factor (k)

Surface

0.05 (low)

0.05 (low)

Subsurface

0.10 (low)

0.28 (moderate)

T Value

4

1

Wind Erodability Group

8

8

105 - Basket - Bondranch families complex (continued)

Soil Manageability
Group
Class

II
2ep

II
3Edp

Range Interpretations

Productivity (lb/acre)

400 to 600

300 to 500

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition, 30% shallow soils; high erosion hazard

Plant competition, 30% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; small stones

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope; large & small stones
25-30% slopes:
Severe - slope

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

GC
GM; GW-GM
—

SC
SC
—

AASHTO Class

Surface
Subsoil
Substratum

A-2-4
A-2-6
—

A-4
A-4
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Poor: Excess fines
Poor: Excess fines
Poor: Slope; small stones
15-25% slopes:
Fair - slope; area reclaim
25-30% slopes:
Poor - slope

Unsuited
Unsuited
Poor: Slope; small stones; area reclaim
15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Basket and Bondranch families on 30 to 60 percent slopes; a soil similar to the St. Marys family, but with less than 35 percent rock fragments in the soil profile; and a soil similar to the St. Marys family, but with no development in the subsoil. Included areas make up approximately 20 percent of the map unit area.

106 - Basket - Bondbranch families - Rock outcrop, metasedimentary complex, 30 to 60 percent slopes

Elevation: 5,500 to 9,085 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Basket Family	Bondbranch family	Rock outcrop, metasedimentary
Approx Proportion	20 percent	20 percent	20 percent
Landscape Position	Mountainsides	Mountainsides	Ridges and mountainsides
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemista tridentata</i>); Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Mormon Tea (<i>Ephedra</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 28 inches; pale brown very channery loam & fine sandy loam; weak very fine subangular blocky structure; neutral	0 to 5 inches; pale brown very gravelly sandy loam & loam; weak fine, medium, & coarse subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	28 to 57 inches; pale brown and light yellowish brown; extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral	5 to 16 inches; brown & yellowish brown gravelly loam; moderate medium subangular blocky structure; neutral	—
Substratum	57 inches; hard metasedimentary rock	16 inches; hard metamorphosed cambrian marine bedrock	—

Soil Properties

Restrictive Layer Depth	25 to 57 inches HB	12 to 20 inches HB	—
Effective Rooting Depth (inches)	40 to 57 inches	12 to 20 inches	—
Available Water Capacity	Very low to low (1.2 to 3.4 inches)	Very low to low (1.2 to 2.7 inches)	—
Water Retention Class	2 (1.2 to 1.5 inches)	1 to 2 (1.2 to 2.7 inches)	—
Hydrologic Soil Group	B	D	—
Permeability (in./hr.)	0.2 to 0.6	0.6 to 2.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to very rapid	Rapid to very rapid	—
Max Erosion Hazard	High	High	—
Erosion Factor (k)			
Surface	0.05 (low)	0.05 (low)	—
Subsurface	0.10 (low)	0.28 (moderate)	—
T Value	4	1	—
Wind Erodability Group	8	8	—

106 - Basket - Bondranch families - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EXgp IV
4EXdgp

Range Interpretations

Productivity (lb/acre)	400 to 600	300 to 500	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 20% shallow soils; high erosion hazard; steep slopes; 20% rock outcrop	Plant competition; 20% shallow soils; high erosion hazard; steep slopes; 20% rock outcrop	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; small stones	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—

Engineering Interpretations

Unified Class			
Surface	GC	SC	—
Subsoil	GM; GW-GM	SC	—
Substratum	—	—	—
AASHTO Class			
Surface	A-2-4	A-4	—
Subsoil	A-2-6	A-4	—
Substratum	—	—	—
Suitability for			
Sand	Poor: Excess fines	Unsuited	—
Gravel	Poor: Excess fines	Unsuited	—
Topsoil	Poor: Slope; small stones	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of rubbleland, on mountainsides; the Bregar and Hartig families, 60 to 80 percent slopes, on mountainsides; the Finley and Mulett families, on toeslopes at lower elevations; and riverwash in canyon bottoms. Included areas make up approximately 40 percent of the map unit area.

107 - Basket - Bondranch families - Rock outcrop, metasedimentary association, 60 to 80 percent slopes

Elevation: 7,000 to 9,700 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Basket family	Bondranch family	Rock outcrop, metasedimentary
Approx Proportion	30 percent	20 percent	20 percent
Landscape Position	Northerly and easterly-facing mountainsides	Southerly and westerly-facing mountainsides	Ridges and upper mountainsides
Typical Vegetation	Singleleaf Pinyon Pine (Pinus monophylla); Big Sagebrush (Artemisia tridentata); Antelope Bitterbrush (Purshia tridentata)	Singleleaf Pinyon Pine (Pinus monophylla); Mormon Tea (Ephedra spp.)	—

Soil Profile Description

Surface Layer	0 to 28 inches; pale brown very channery loam & fine sandy loam; weak very fine subangular blocky structure; neutral	0 to 5 inches; pale brown very gravelly sandy loam & loam; weak fine, medium & coarse subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	28 to 57 inches; pale brown and light yellowish brown, extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral	5 to 16 inches; brown & yellowish brown gravelly loam; moderate medium subangular blocky structure; neutral	—
Substratum	57 inches; hard metasedimentary bedrock	16 inches; hard metamorphosed cambrian marine bedrock	—

Soil Properties

Restrictive Layer Depth	25 to 57 inches HB	12 to 20 inches HB	—
Effective Rooting Depth (inches)	40 to 57 inches	12 to 20 inches	—
Available Water Capacity	Very low to low (1.2 to 3.4 inches)	Very low to low (1.2 to 2.7 inches)	—
Water Retention Class	2 (1.2 to 1.5 inches)	1 to 2 (1.2 to 2.7 inches)	—
Hydrologic Soil Group	B	D	—
Permeability (in./hr.)	0.2 to 0.6	0.6 to 2.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Very rapid	Very rapid	—
Max Erosion Hazard	High	High	—
Erosion Factor (k)			
Surface	0.05 (low)	0.05 (low)	—
Subsurface	0.10 (low)	0.28 (moderate)	—
T Value	4	1	—
Wind Erodability Group	8	8	—

107 - Basket - Bondranch families - Rock outcrop (continued)

Soil Manageability Group Class	IV 4EGXp	IV 4EGXdp	IV —
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Range Interpretations

Productivity (lb/acre)	400 to 600	300 to 500	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 20% shallow soils; 20% rock outcrop; high erosion hazard; very steep slopes	Plant competition; 20% shallow soils; 20% rock outcrop; high erosion hazard; very steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; small stones	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—

Engineering Interpretations

Unified Class Surface	GC	SC	—
Subsoil	GM;GW-GM	SC	—
Substratum	—	—	—
AASHTO Class Surface	A-2-4	A-4	—
Subsoil	A-2-6	A-4	—
Substratum	—	—	—
Suitability for Sand	Poor: Excess fines	Unsuited	—
Gravel	Poor: Excess fines	Unsuited	—
Topsoil	Poor: Slope; small stones	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Basket and Bondranch families, 15 to 30 percent slopes, on mountainsides; the Mulett family, 30 to 60 percent slopes, on southerly and westerly-facing mountainsides, at lower elevations; and a soil similar to the Spaa family, but shallow to soft bedrock, on northerly and easterly-facing mountainsides. Included areas make up approximately 30 percent of the map unit area.

108 - Basket - Bregar families complex, 15 to 30 percent slopes

Elevation: 6,800 to 8,500 feet Annual Precipitation: 8 to 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Basket family

50 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*);
Antelope Bitterbrush (*Purshia tridentata*)

Bregar family

30 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big
Sagebrush (*Artemisia tridentata*); Antelope
Bitterbrush (*Purshia tridentata*)

Soil Profile Description

Surface Layer

0 to 28 inches; pale brown very channery
loam & fine sandy loam; weak very fine
subangular blocky structure; neutral

0 to 2 inches; light brownish gray very cobbly
loam; weak medium platy structure; mildly
alkaline

Subsoil

28 to 57 inches; pale brown and light
yellowish brown, extremely channery loam &
clay loam; moderate very fine angular blocky
structure; neutral

2 to 15 inches; light yellowish brown extremely
gravelly & extremely cobbly loam; massive;
neutral to mildly alkaline

Substratum

57 inches; hard metasedimentary bedrock

15 inches; hard fractured silty shale bedrock

Soil Properties

Restrictive Layer Depth

25 to 57 inches HB

15 to 20 inches FB

Effective Rooting
Depth (inches)

40 to 57 inches

15 to 20 inches

Available Water
Capacity

Very low to low (1.2 to 3.4 inches)

Very low (0.6 to 1.1 inches)

Water Retention Class

2 (1.2 to 1.5 inches)

3 (0.6 to 1.1 inches)

Hydrologic Soil Group

B

D

Permeability (in./hr.)

0.2 to 0.6

0.6 to 2.0

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate - High

Moderate - High

Erosion Factor (k)

Surface

0.05 (low)

0.10 (low)

Subsurface

0.10 (low)

0.05 (low)

T Value

4

1

Wind Erodability
Group

8

8

108 - Basket - Bregar families complex (continued)

Soil Manageability
Group
Class

II
2ep

II
3Ped

Range Interpretations

Productivity (lb/acre)

400 to 600

300 to 500

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 30% shallow soils; high erosion hazard

Plant competition; 30% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; small stones

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope; large & small stones
25-30% slopes:
Severe - slope

15-25% slopes:
Moderate - large & small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

GC
GM; GW-GM
—

GC
GC; GW-GM
—

AASHTO Class
Surface
Subsoil
Substratum

A-2-4
A-2-6
—

A-2-4
A-2-4
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Poor: Excess fines
Poor: Excess fines
Poor: Slope; small stones
15-25% slopes:
Fair - Slope; area reclaim
25-30% slopes:
Poor - slope:

Unsuited
Unsuited
Poor: Slope; area reclaim; small stones
15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Hartig family; and a soil similar to the Bregar family, but shallow to soft bedrock. Included areas make up approximately 20 percent of the map unit area.

109 - Basket- Packham - Soakpak families association, 30 to 60 percent slopes

Elevation: 7,040 to 9,900 feet Annual Precipitation: 8 to 12 inches

Soil Map Unit Components	Basket family	Packham family	Soakpak family
Approx Proportion	35 percent	25 percent	20 percent
Landscape Position	Southerly and westerly facing mountainsides	Mid to lower northerly and easterly facing mountainsides	Upper northerly and easterly facing mountainsides
Slope	30 to 60 percent slopes	30 to 60 percent slopes	30 to 60 percent slopes
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Wheatgrass (<i>Agropyron spp.</i>)	Carex (<i>Carex spp.</i>); Low Phlox (<i>Phlox hoodii</i>); Pringle Blue grass (<i>Poa pringleii</i>)

Soil Profile Description

Surface Layer	0 to 28 inches; pale brown very channery fine sandy loam & loam; weak very fine subangular blocky structure; neutral	0 to 3 inches; pale brown extremely cobbly sandy loam; moderate very thick platy structure; neutral	0 to 9 inches; grayish brown & brown extremely cobbly & very gravelly sandy loam; moderate fine & medium, & weak very fine & fine subangular blocky structure; slightly to medium acid
Subsoil	28 to 57 inches; pale brown and light yellowish brown, extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral	3 to 15 inches; yellowish brown very gravelly & extremely gravelly sandy clay loam; massive; neutral	9 to 27 inches; pale brown very gravelly sandy loam; weak very fine & fine subangular blocky structure; medium acid
Substratum	57 inches; hard metasedimentary bedrock	15 to 60+ inches; light yellowish brown & very pale brown gravelly & extremely gravelly sandy loam; massive; none to violently effervescent; neutral to moderately alkaline	27 to 42 inches; light gray very gravelly sandy loam; weak very fine & fine subangular blocky structure; medium acid 42 inches; hard fractured granodiorite bedrock

Soil Properties

Restrictive Layer Depth	25 to 57 inches HB	30 to 60 inches FB	30 to 60 + inches FB
Effective Rooting Depth (inches)	40 to 57 inches	20 to 50 inches	20 to 40 inches
Available Water Capacity	Very low to low (1.2 to 3.4 inches)	Very low to low (1.3 to 3.3 inches)	Very low to moderate (1.7 to 4.2 inches)
Water Retention Class	2 (1.2 to 1.5 inches)	2 to 3 (1.0 to 1.2 inches)	2 (1.3 to 1.6 inches)
Hydrologic Soil Group	B	B	B
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	0.6 to 2.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid to Very Rapid	Rapid to Very Rapid	Rapid to Very Rapid
Max Erosion Hazard	High	Moderate to High	Moderate to High
Erosion Factor (k)			
Surface	0.05 (low)	0.05 (low)	0.17 (low)
Subsurface	0.10 (low)	0.05 (low)	0.10 (low)
T Value	4	3	4
Wind Erodability Group	8	8	8

109 - Basket- Packham - Soakpak families association (continued)

Soil Manageability
Group
Class

III
3Egpx

III
3Pegx

III
3Egpx

Range Interpretations

Productivity (lb/acre)

400 to 600

500 to 700

75 to 100

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; small stones

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Severe Slope

Paths & Trails

Severe: Slope

Severe: Slope; large stones

Severe: Slope

Engineering Interpretations

Unified Class

Surface

GC

GM; GW-GM

SM-SC

Subsoil

GM; GW-GM

GM; GW-GM

GW-GM; GM-GC

Substratum

—

GM; GW-GM

GW-GM; GM-GC

AASHTO Class

Surface

A-2-4

A-1-a; A-1-b; A-2-4

A-4

Subsoil

A-2-6

A-2-6

A-2-4

Substratum

—

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Poor: Excess fines

Unsuited

Unsuited

Gravel

Poor: Excess fines

Poor: Excess fines

Poor: Excess fines

Topsoil

Poor: Slope; small stones

Poor: Slope; small stones

Poor: Slope; small stones

Roadfill

Poor: Slope

Poor: Slope

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of granitic rock outcrop, on mountainsides and ridges; and a soil similar to the Soakpak family, but with a cryic temperature regime, on mid to upper northerly and easterly-facing mountainsides. Included areas make up approximately 20 percent of the map unit area.

110 - Bearskin - Toeja families complex, 30 to 60 percent slopes

Elevation: 6,720 to 7,760 feet Annual Precipitation: 11 to 12 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Bearskin family

45 percent

Mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*);
Antelope Bitterbrush (*Purshia tridentata*)

Toeja family

35 percent

Mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Curleaf Mountain Mahogany (*Cercocarpus ledifolius*); Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

1 to 0 inch; Litter

1 to 0 inch; Litter

0 to 2 inches; brown very cobbly sandy loam;
weak very fine & fine subangular blocky
structure; neutral

0 to 12 inches; light brownish gray & grayish
brown very cobbly sandy loam & gravelly loam;
weak very coarse platy & weak medium
subangular blocky structure; moderately alkaline

Subsoil

2 to 17 inches; brown cobbly sandy clay loam
& sandy clay loam; moderate medium &
coarse, and strong coarse subangular blocky
structure; neutral

12 to 22 inches; yellowish brown gravelly sandy
clay loam; strong fine & medium subangular
blocky structure; moderately alkaline

Substratum

17 inches; hard basalt bedrock

22 inches; weathered rhyolite (paralithic contact)

Soil Properties

Restrictive Layer Depth

13 to 20 inches HB

21 to 24 inches PARA

Effective Rooting
Depth (inches)

13 to 20 inches

21 to 24 inches

Available Water
Capacity

Very low to low (1.6 to 3.2 inches)

Low (2.4 to 3.4 inches)

Water Retention Class

1 to 2 (1.6 to 3.2 inches)

1 to 2 (2.1 to 2.7 inches)

Hydrologic Soil Group

D

C

Permeability (in./hr.)

0.2 to 0.6

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Rapid to Very Rapid

Max Erosion Hazard

High

High to Very High

Erosion Factor (k)

Surface

0.02 (low)

0.10 (low)

Subsurface

0.10 (low)

0.28 (moderate)

T Value

1

2

Wind Erodability
Group

8

8

110 - Bearskin - Toeja families complex (continued)

Soil Manageability
Group
Class

III
3Edgpx

III
3Egx

Range Interpretations

Productivity (lb/acre)

400 to 600

600 to 1000

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 45% shallow soils; 10%
rock outcrop; high erosion hazard; steep slopes

Plant competition; 45% shallow soils; 10% rock
outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope; large stones

Severe: Slope

Engineering Interpretations

Unified Class

Surface

SC

SM

Subsoil

SM

SM

Substratum

—

—

AASHTO Class

Surface

A-2-4

A-4

Subsoil

A-6

A-2-7

Substratum

—

—

Suitability for

Sand

Poor: Excess fines

Poor: Excess fines

Gravel

Unsuited

Unsuited

Topsoil

Poor: Slope

Poor: Slope; small stones

Roadfill

Poor: Slope; area reclaim

Poor: Slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Berent family, but colder, 15 to 30 percent slopes, in mountain valleys and canyons; and 10 percent basalt rock outcrop, on mountainsides and ridges. Included areas make up approximately 20 percent of the map unit area.

111 - Berent family, 5 to 15 percent slopes

Elevation: 6,700 to 7,800 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Berent family

80 percent

Landscape Position

Stabalized sand dunes, superimposed on basalt flows

Slope

5 to 15 percent

Typical Vegetation

Big Sagebrush (*Artemisia tridentata*);
Bitterbrush (*Purshia tridentata*)

Soil Profile Description

Surface Layer

0 to 13 inches; pale brown & brown loamy sand & gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline

Subsoil

—

Substratum

13 to 60 inches; pale brown & light yellowish brown loamy fine sand, medium sand, and gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

Effective Rooting Depth (inches)

20 to 40 inches

Available Water Capacity

Low to moderate (3.8 to 5.0 inches)

Water Retention Class

2 to 3 (1.1 to 1.6 inches)

Hydrologic Soil Group

A

Permeability (in./hr.)

2.0 to 6.0

Drainage Class

Well drained

Runoff

Medium

Max Erosion Hazard

High

Erosion Factor (k)

Surface

0.15 (low)

Subsurface

0.10 (low)

T Value

4

Wind Erodability Group

2

111 - Berent family (continued)

Soil Manageability
Group III
Class 3Ep

Range Interpretations

Productivity (lb/acre) 300 to 400
Suitability Summer - Autumn
Most Limiting Factors High erosion hazard

Recreation Interpretations - Limitations for

Camp Areas 5-8% slopes:
Moderate - Too sandy
8-15% slopes:
Moderate - slope; Too sandy
Picnic Areas Severe: Too sandy
Paths & Trails Moderate: Too sandy

Engineering Interpretations

Unified Class
Surface SM; SW-SM
Subsoil —
Substratum SM; SW-SM
AASHTO Class
Surface A-2-4
Subsoil —
Substratum A-2-4
Suitability for
Sand Poor: Excess fines
Gravel Unsuitable
Topsoil 5-8% slopes:
Fair - Too sandy
8-15% slopes:
Fair - slope; Too sandy
Roadfill Good

Included Areas & Remarks

Included in this map unit are small areas of the Abgese family, on toeslopes bordering the Berent family; the Berent family, 15 to 30 percent slopes, on steeper sand dunes; and a soil similar to the Berent family, but only 1 foot deep to the underlying Abgese and Toeja families, 15 to 30 percent slopes, on steep sand dunes. Included areas make up approximately 20 percent of the map unit area.

112 - Berent family - Rock outcrop, granitic complex, 5 to 30 percent slopes

Elevation: 6,150 to 6,800 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Berent family

Rock outcrop, granitic

Landscape Position

55 percent

20 percent

Slope

Basin fills

Protrusions throughout the unit

Typical Vegetation

5 to 30 percent

—

Big Sagebrush (*Artemisia tridentata*);
Antelope Bitterbrush (*Purshia tridentata*)

—

Soil Profile Description

Surface Layer

0 to 13 inches; pale brown & brown loamy sand & gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

13 to 60 inches; pale brown & light yellowish brown loamy fine sand, medium sand, and gravelly sandy loam; massive; moderately alkaline

—

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

—

Effective Rooting Depth (inches)

20 to 40 inches

—

Available Water Capacity

Low to moderate (3.8 to 5.0 inches)

—

Water Retention Class

2 to 3 (1.1 to 1.6 inches)

—

Hydrologic Soil Group

A

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Medium to Rapid

—

Max Erosion Hazard

High

—

Erosion Factor (k)

Surface

0.15 (low)

—

Subsurface

0.10 (low)

—

T Value

4

—

Wind Erodability Group

2

—

112 - Berent family - Rock outcrop (continued)

Soil Manageability Group Class	III 3Ep	III
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Range Interpretations

Productivity (lb/acre)	300 to 400	—
Suitability	Summer - Autumn	—
Most Limiting Factors	20% rock outcrop; high erosion hazard	—

Recreation Interpretations - Limitations for

Camp Areas	5-8% slopes: Moderate - Too sandy	—
	8-15% slopes: Moderate - slope; Too sandy	
Picnic Areas	Severe: Too sandy	—
Paths & Trails	Moderate: Too sandy	—

Engineering Interpretations

Unified Class		
Surface	SM; SW-SM	—
Subsoil	—	—
Substratum	SM; SW-SM	—
AASHTO Class		
Surface	A-2-4	—
Subsoil	—	—
Substratum	A-2-4	—
Suitability for		
Sand	Poor: Excess fines	—
Gravel	Unsuited	—
Topsoil	5-8% slopes: Fair - Too sandy	—
	8-15% slopes: Fair - slope; Too sandy	
Roadfill	Good	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Yuko family, but with a clayey control section, 5 to 15 percent slopes, on gentle benches bordering steep mountainsides; a soil similar to the Hartig family, but less than 20 inches to soft bedrock, 15 to 30 percent slopes, under rock outcroppings; and the Wrango family, 5 to 15 percent slopes, in basin fills. Included areas make up approximately 25 percent of the map unit area.

113 - Beveridge family - Rock outcrop, limestone complex, 60 to 80 percent slopes

Elevation: 6,400 to 9,500 feet Annual Precipitation: 11 inches

Soil Map Unit Components

Approx Proportion

Beveridge family

Rock outcrop, Limestone

Landscape Position

60 percent

25 percent

Slope

Colluvial mountainsides

Ridges & mountainsides

Typical Vegetation

60 to 80 percent

—

Curlleaf Mountain Mahogany (*Cercocarpus ledifolius*); Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*)

—

Soil Profile Description

Surface Layer

0 to 2 inches; pale brown very gravelly loamy sand; single grained; violently effervescent; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

2 to 13 inches; brown extremely cobbly and extremely stony loam; weak very fine subangular blocky structure; violently effervescent; moderately alkaline

—

13 inches; hard fractured limestone bedrock

Soil Properties

Restrictive Layer Depth

10 to 20 inches FB

—

Effective Rooting Depth (inches)

10 to 20 inches

—

Available Water Capacity

Very low (0.3 to 0.9 inches)

—

Water Retention Class

3 (0.3 to 0.9 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

0.6 to 2.0

—

Drainage Class

Well drained

—

Runoff

Very Rapid

—

Max Erosion Hazard

Very High

—

Erosion Factor (k)

Surface

0.02 (low)

—

Subsurface

0.05 (low)

—

T Value

1

—

Wind Erodability Group

8

—

113 - Beveridge family - Rock outcrop (continued)

Soil Manageability Group	IV	IV
Class	4EGPXd	

Range Interpretations

Productivity (lb/acre)	600 to 1000	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 60% shallow soils; 35% rock outcrop; very high erosion hazard; very steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; Too sandy	—
Picnic Areas	Severe: Slope; Too sandy	—
Paths & Trails	Severe: Slope; Too sandy	—

Engineering Interpretations

Unified Class		
Surface	GW	—
Subsoil	SM	—
Substratum	—	—
AASHTO Class		
Surface	A-1-a; A-1-b; A-2-4	—
Subsoil	A-1-b; A-2-4	—
Substratum	—	—
Suitability for		
Sand	Poor: Thin layer	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of metasedimentary rock outcrop, on ridges and mountainsides; and a soil similar to the Beveridge family, but moister, on mountainsides. Included areas make up approximately 15 percent of the map unit area.

114 - Blackston family, 15 to 30 percent slopes

Elevation: 5,200 to 7,000 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion	75 percent
Landscape Position	Dissected alluvial fans
Slope	15 to 30 percent
Typical Vegetation	Spiny Menodora (<i>Mendora spinescens</i>); Nevada Ephedra (<i>Ephedra nevadensis</i>)

Blackston family

Soil Profile Description

Surface Layer	0 to 7 inches; very pale brown gravelly sandy loam; moderate very thin and thin platy, & weak very fine & fine subangular blocky structure; mildly alkaline
Subsoil	—
Substratum	7 to 60 inches; light gray and white gravelly loam & extremely gravelly sandy loam; weak very fine, fine & medium subangular blocky structure & massive; mildly alkaline

Soil Properties

Restrictive Layer Depth	Greater than 60 inches
Effective Rooting Depth (inches)	40 to 60 inches
Available Water Capacity	Low (2.3 to 3.0 inches)
Water Retention Class	2 (1.7 to 2.2 inches)
Hydrologic Soil Group	B
Permeability (in./hr.)	0.6 to 2.0
Drainage Class	Well drained
Runoff	Rapid
Max Erosion Hazard	High
Erosion Factor (k)	
Surface	0.10 (low)
Subsurface	0.10 (low)
T Value	1
Wind Erodability Group	8

114 - Blackston family (continued)

Soil Manageability
Group
Class

III
3E

Range Interpretations

Productivity (lb/acre) 300 - 400
Suitability Summer - Autumn
Most Limiting Factors High erosion hazard

Recreation Interpretations - Limitations for

Camp Areas Severe: Slope
Picnic Areas Severe: Slope
Paths & Trails 15-25% slopes:
Moderate - slope; Small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class
Surface SM-SC
Subsoil —
Substratum GW-GM;GM-GC
AASHTO Class
Surface A-2-4
Subsoil —
Substratum A-2-4
Suitability for
Sand Unsuitied
Gravel Unsuitied
Topsoil Poor: slope
Roadfill 15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Gol family, but warmer and shallow to a hard calcium layer, 9 to 15 percent slopes, on gentle fans; and the Sanpete and Mackey families, on dissected alluvial fans. Included areas make up approximately 25 percent of the map unit area.

115 - Bluewing - Trocken families association, 5 to 15 percent slopes

Elevation: 4,600 to 7,200 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Bluewing family

55 percent

Major stream valley bottoms

5 to 15 percent

Shadscale (*Atriplex confertifolia*); Boxthorn (*Lycium* spp.)

Trocken family

25 percent

Alluvial fans bordering stream valleys

5 to 15 percent

Big Sagebrush (*Artemisia tridentata*); Green fire (*Mendora* spp.)

Soil Profile Description

Surface Layer

0 to 3 inches; pale brown very stony loamy fine sand; weak fine granular structure; moderately alkaline

0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline

Subsoil

—

—

Substratum

3 to 60 inches; pale brown very cobbly loamy fine sand; very fine single grained; moderately alkaline

9 to 60 inches; light yellowish brown very gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

24 to 60+ inches HB

Effective Rooting Depth (inches)

40 to 60 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.8 to 2.2 inches)

Very low to low (1.3 to 4.0 inches)

Water Retention Class

3 (0.7 to 0.9 inches)

2 to 3 (1.1 to 1.4 inches)

Hydrologic Soil Group

A

B

Permeability (in./hr.)

6.0 to 20.0

2.0 to 6.0

Drainage Class

Somewhat excessive

Well drained

Runoff

Medium

Medium

Max Erosion Hazard

Moderate

High

Erosion Factor (k)

Surface

0.05 (low)

0.10 (low)

Subsurface

0.05 (low)

0.05 (low)

T Value

4

3

Wind Erodability Group

2

8

115 - Bluewing - Trocken families association (continued)

Soil Manageability
Group
Class

II
2epx

II
3Epx

Range Interpretations

Productivity (lb/acre)

100 to 300

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Large stones

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Picnic Areas

Severe: Large stones

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Paths & Trails

Severe: Large stones

Moderate: Small stones

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

SM-SC
—
GW-GM

SM
—
GW-GM; GM-GC

AASHTO Class
Surface
Subsoil
Substratum

A-2-4
—
A-1-b; A-2-4

A-1-a; A-2-4
—
A-1-a; A-1-b, A-2-4

Suitability for
Sand
Gravel
Topsoil
Roadfill

Poor: Excess fines
Fair: Excess fines; large stones
Poor: Large & small stones
Fair: Large stones

Unsuited
Poor: Excess fines
Poor: Small stones
Good

Included Areas & Remarks

Included in this soil map unit are small areas of the Trocken family, on sideslopes of alluvial fans; and Riverwash, in stream valleys. Included areas make up approximately 20 percent of the map unit area.

116 - Brad family - Rock outcrop, granitic complex, 15 to 30 percent slopes

Elevation: 7,600 to 9,900 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion

Brad family

Rock outcrop, granitic

Landscape Position

Mountainsides, ridges & benches

Throughout unit

Slope

15 to 30 percent

—

Typical Vegetation

Singleleaf Pinyon Pine (*Pinus monophylla*);
Curleaf Mountain Mahogany (*Cercocarpus ledifolius*)

—

Soil Profile Description

Surface Layer

0 to 3 inches; dark grayish brown very gravelly sand; weak medium granular structure; neutral

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

3 to 6 inches; dark grayish brown very gravelly loamy sand; massive; neutral

6 inches; hard adamellite bedrock

Soil Properties

Restrictive Layer Depth

4 to 8 inches HB

—

Effective Rooting Depth (inches)

4 to 8 inches

—

Available Water Capacity

Very low (0.1 to 0.3 inches)

—

Water Retention Class

3 (0.1 to 0.3 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

6.0 to 20.0

—

Drainage Class

Excessive

—

Runoff

Rapid

—

Max Erosion Hazard

High to Very High

—

Erosion Factor (k)

Surface

0.02 (low)

—

Subsurface

0.05 (low)

—

T Value

1

—

Wind Erodability Group

8

—

116 - Brad family - Rock outcrop (continued)

Soil Manageability Group Class	IV 4DEPX	IV —
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Range Interpretations

Productivity (lb/acre)	600 to 1000	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 45% shallow soils; 40% rock outcrop; very high erosion hazard	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; small stones; depth to rock	—
Picnic Areas	Severe: Slope; large & small stones; too sandy	—
Paths & Trails	15-25% slopes: Severe - Large & small stones; 25-30% slopes: Severe - slope; large & small stones	—

Engineering Interpretations

Unified Class		
Surface	GW-GM	—
Subsoil	—	—
Substratum	GW-GM	—
AASHTO Class		
Surface	A-1-a; A-1-b; A-2-4	—
Subsoil	—	—
Substratum	A-1-a; A-1-b; A-2-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Poor: Thin layer	—
Topsoil	Poor: Slope; area reclaim; thin layer; small stones	—
Roadfill	15-25% slopes: Poor - area reclaim 25-30% slopes: Poor - slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Sumine family, on mountainsides; a soil similar to the Hartig family, but with a sandy-skeletal control section, on mountainsides; and a soil similar to the Wrango family, but cooler, 2 to 5 percent slopes, in drainages. Included areas make up approximately 15 percent of the map unit area.

117 - Bregar - Slinger families - Rock outcrop, metasedimentary complex, 30 to 60 percent slopes

Elevation: 6,100 to 10,480 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Bregar family	Slinger family	Rock outcrop, metasedimentary
Approx Proportion	40 percent	20 percent	15 percent
Landscape Position	Mountainsides	Mountainsides	Mountainsides and ridges
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 2 inches; light brownish gray very cobbly loam; weak medium platy structure; mildly alkaline	1 to 0 inch; Litter 0 to 14 inches; pale brown very gravelly sandy loam; weak fine granular structure & massive; slightly to strongly effervescent; mildly alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	2 to 15 inches; light yellowish brown extremely gravelly & extremely cobbly loam; massive; neutral to mildly alkaline	—	—
Substratum	15 inches; hard fractured silty shale bedrock	14 to 60 inches; light gray, very pale brown very gravelly sandy loam; massive; violently effervescent; moderately alkaline	—

Soil Properties

Restrictive Layer Depth	15 to 20 inches FB	35 to 60+ inches FB	—
Effective Rooting Depth (inches)	15 to 20 inches	35 to 60 inches	—
Available Water Capacity	Very low (0.6 to 1.1 inches)	Very low to low (1.7 to 3.5 inches)	—
Water Retention Class	3 (0.6 to 1.1 inches)	2 (1.2 to 1.4 inches)	—
Hydrologic Soil Group	D	B	—
Permeability (in./hr.)	0.6 to 2.0	2.0 to 6.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to Very Rapid	Rapid to Very Rapid	—
Max Erosion Hazard	High	Moderate to High	—
Erosion Factor (k)			
Surface	0.10 (low)	0.10 (low)	—
Subsurface	0.05 (low)	0.10 (low)	—
T Value	1	4	—
Wind Erodability Group	8	8	—

117 - Bregar - Slinger families - Rock outcrop (continued)

Soil Manageability Group Class	IV 4EPXdg	IV 3Xegp	IV —
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Range Interpretations

Productivity (lb/acre)	300 to 500	500 to 700	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 40% shallow soils; 25% rock outcrop; high erosion hazard; steep slopes	Plant competition; 40% shallow soils; 25% rock outcrop; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: slope	Severe: slope	—
Picnic Areas	Severe: slope	Severe: slope	—
Paths & Trails	Severe: slope	Severe: slope	—

Engineering Interpretations

Unified Class Surface	GC	SM; SW-SM	—
Subsoil	GC; GW-GM	—	—
Substratum	—	GM; GW-GM	—
AASHTO Class Surface	A-2-4	A-1-a; A-1-b; A-2-4	—
Subsoil	A-2-4	—	—
Substratum	—	A-1-a; A-1-b; A-2-4	—
Suitability for Sand	Unsuited	Unsuited	—
Gravel	Unsuited	Poor: Excess fines	—
Topsoil	Poor: Slope; area reclaim; small stones	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	Poor: Slope	—

Included Areas & Remarks

Included in this map unit are small areas of the Bregar and Slinger families, 60 to 80 percent percent slopes, on mountainsides and ridges; limestone rock outcrop and rubbleland, on mountainsides and ridges; and a soil similar to the Beveridge family, but moister, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

118 - Cinder cones

Elevation:

Annual Precipitation:

Soil Map Unit
Components

—

Approx Proportion

—

Landscape Position

—

Slope

—

Typical Vegetation

—

Soil Profile Description

Surface Layer

Cinder cones consist of areas of detached volcanic cinders which have accumulated around volcanic vents. These areas support little or no vegetation

Subsoil

—

Substratum

—

Soil Properties

Restrictive Layer Depth

—

Effective Rooting
Depth (inches)

—

Available Water
Capacity

—

Water Retention Class

—

Hydrologic Soil Group

—

Permeability (in./hr.)

—

Drainage Class

—

Runoff

—

Max Erosion Hazard

—

Erosion Factor (k)

Surface

—

Subsurface

—

T Value

—

Wind Erodability
Group

—

118 - Cinder cones (continued)

Soil Manageability
Group —
Class —

Range Interpretations

Productivity (lb/acre) —
Suitability —
Most Limiting Factors —

Recreation Interpretations - Limitations for

Camp Areas —
Picnic Areas —
Paths & Trails —

Engineering Interpretations

Unified Class
Surface —
Subsoil —
Substratum —

AASHTO Class
Surface —
Subsoil —
Substratum —

Suitability for
Sand —
Gravel —
Topsoil —
Roadfill —

Included Areas & Remarks

119 - Credo family, 15 to 30 percent slopes

Elevation: 7,960 to 8,600 feet Annual Precipitation: 12 inches

Soil Map Unit Components	Credo family
Approx Proportion	85 percent
Landscape Position	Mountainsides
Slope	15 to 30 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.); Juniper(<i>Juniperus</i> spp.)

Soil Profile Description

Surface Layer	0 to 2 inches; light brownish gray very gravelly coarse sand; weak fine granular structure; slightly acid
Subsoil	2 to 28 inches; light brownish gray, pale brown sandy loam & gravelly sandy clay loam; moderate fine, medium & coarse subangular blocky structure; slightly to medium acid
Substratum	28 to 37 inches; pale brown sandy loam; massive; medium acid 37 inches; highly weathered pyroclastic material (paralithic contact)

Soil Properties

Restrictive Layer Depth	37 to 60+ inches PARA
Effective Rooting Depth (inches)	20 to 40 inches
Available Water Capacity	Low to moderate (3.6 to 7.6 inches)
Water Retention Class	1 to 2 (1.9 to 2.5 inches)
Hydrologic Soil Group	C
Permeability (in./hr.)	0.2 to 0.6
Drainage Class	Well drained
Runoff	Rapid
Max Erosion Hazard	Moderate to High
Erosion Factor (k)	
Surface	0.05 (low)
Subsurface	0.15 (low)
T Value	2
Wind Erodability Group	8

119 - Credo family (continued)

Soil Manageability
Group II
Class 2epx

Range Interpretations

Productivity (lb/acre) 300 to 500
Suitability Summer - Autumn
Most Limiting Factors Plant competition; 10% rock outcrop

Recreation Interpretations - Limitations for

Camp Areas Severe: slope
Picnic Areas Severe: slope
Paths & Trails 15-25% slopes:
Moderate - slope; Too sandy
25-30% slopes:
Severe slope

Engineering Interpretations

Unified Class
Surface SM-SC
Subsoil CL
Substratum CL
AASHTO Class
Surface A-2-4, A-4
Subsoil A-6
Substratum A-6
Suitability for
Sand Unsuitied
Gravel Unsuitied
Topsoil Poor: Slope
Roadfill 15-25% slopes:
Poor - low strength
25-30% slopes:
Poor - slope; low strength

Included Areas & Remarks

Include in this map unit are small areas of basalt rock outcrop, on ridges and mountainsides; and the Spaa family, on ridgetops and upper mountainsides. Included areas make up approximately 15 percent of the map unit area.

120 - Credo - Basket families complex, 30 to 60 percent slopes

Elevation: 7,200 to 8,320 feet Annual Precipitation: 8 to 12 inches

Soil Map Unit Components	Credo family	Basket family
Approx Proportion	50 percent	25 percent
Landscape Position	Mountainsides	Mountainsides
Slope	30 to 60 percent	30 to 60 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Rabbitbrush (<i>Chrysothamus</i> spp.); Juniper (<i>Juniperus</i> spp.)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 2 inches; light brownish gray very gravelly coarse sand; weak fine granular structure; slightly acid	0 to 28 inches; pale brown very channery fine sandy loam & loam; weak very fine subangular blocky structure; neutral
Subsoil	2 to 28 inches; light brownish gray, pale brown sandy loam & gravelly sandy clay loam; moderate fine, medium & coarse subangular blocky structure; slightly to medium acid	28 to 57 inches; pale brown and light yellowish brown extremely channery clay loam; moderate very fine angular structure; neutral
Substratum	28 to 37 inches; pale brown sandy loam; massive; medium acid 37 inches; highly weathered pyroclastic materials (paralithic contact)	57 inches; hard metasedimentary bedrock

Soil Properties

Restrictive Layer Depth	37 to 60+ inches PARA	25 to 57 inches HB
Effective Rooting Depth (inches)	20 to 40 inches	40 to 57 inches
Available Water Capacity	low to moderate (3.6 to 7.6 inches)	Very low to low (1.2 to 3.4 inches)
Water Retention Class	1 to 2 (1.9 to 2.5 inches)	2 (1.2 to 1.5 inches)
Hydrologic Soil Group	C	B
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6
Drainage Class	Well drained	Well drained
Runoff	Rapid - very rapid	Rapid - very rapid
Max Erosion Hazard	High	High
Erosion Factor (k)		
Surface	0.05 (low)	0.05 (low)
Subsurface	0.15 (low)	0.10 (low)
T Value	2	4
Wind Erodability Group	8	8

120 - Credo - Basket families complex (continued)

Soil Manageability
Group
Class

III
3 Egpx

III
3 Egpx

Range Interpretations

Productivity (lb/acre)

300 to 500

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: slope: small stones

Picnic Areas

Severe: Slope

Severe: slope

Paths & Trails

Severe: Slope

Severe: slope

Engineering Interpretations

Unified Class

Surface

SM-SC

GC

Subsoil

CL

GM; GW-GM

Substratum

CL

—

AASHTO Class

Surface

A-2-4; A-4

A-2-4

Subsoil

A-6

A-2-6

Substratum

A-6

—

Suitability for

Sand

Unsuited

Poor: Excess fines

Gravel

Unsuited

Poor: Excess fines

Topsoil

Poor: Slope

Poor: Slope; small stones

Roadfill

Poor: Slope; low strength

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Typic Xerorthents soils, but cooler and finer textured, 9 to 30 percent slopes, in depressions; basalt rock outcrop, on ridges and escarpments; and a soil similar to the Hartig family, but with less than 35 percent rock fragments in the profile, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

121 - Finley family, 15 to 30 percent slopes

Elevation: 5,600 to 7,100 feet Annual Precipitation: 9 inches

Soil Map Unit Components	Finley family
Approx Proportion	75 percent
Landscape Position	Mountainsides
Slope	15 to 30 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 7 inches; light brownish gray gravelly fine sandy loam; weak fine granular structure; mildly alkaline
Subsoil	7 to 18 inches; pale brown very gravelly loam; moderate fine subangular blocky structure; mildly alkaline
Substratum	18 to 29 inches; pale brown very gravelly sandy loam; massive; moderately alkaline 29 inches; hard metasedimentary bedrock

Soil Properties

Restrictive Layer Depth	25 to 35 inches HB
Effective Rooting Depth (inches)	25 to 35 inches
Available Water Capacity	very low to low (1.7 to 3.0 inches)
Water Retention Class	2 (1.5 to 1.8 inches)
Hydrologic Soil Group	C
Permeability (in./hr.)	0.6 to 2.0
Drainage Class	Well drained
Runoff	Rapid
Max Erosion Hazard	High
Erosion Factor (k)	
Surface	0.15 (low)
Subsurface	0.10 (low)
T Value	2
Wind Erodability Group	8

121 - Finley family (continued)

Soil Manageability
Group
Class

III
3Epx

Range Interpretations

Productivity (lb/acre)

300 to 500

Suitability

Summer - Autumn

Most Limiting Factors

Plant competition; 5 percent rock outcrop;
high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Picnic Areas

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class

Surface

SM-SC

Subsoil

GM-GC

Substratum

SW-SM; SM-SC

AASHTO Class

Surface

A-2-4; A-4

Subsoil

A-1-b; A-2-4

Substratum

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Gravel

Unsuited

Topsoil

Poor: Slope; small stones

Roadfill

15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Washoe family, but drier, 9 to 15 percent slopes, on toeslopes; a soil similar to the Bondbranch family, but warmer, on ridgetops; and basalt rock outcrop, on ridges and mountainsides. Included areas make up approximately 25 percent of the map unit area.

122 - Finley - Moano - Mulett families complex, 5 to 40 percent slopes

Elevation: 6,800 to 8,800 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Finley family	Moano family	Mulett family
Approx Proportion	30 percent	20 percent	20 percent
Landscape Position	Mid to lower mountainsides	Ridgetops and upper mountainsides	Sideslopes of ridgetops
Slope	15 to 40 percent	5 to 15 percent	30 to 40 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Singleleaf Pinyon Pine (<i>Pinus monophylla</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 7 inches; light brownish gray gravelly fine sandy loam; weak fine granular structure; mildly alkaline	0 to 3 inches; light yellowish brown loam; weak fine granular structure; moderately alkaline	0 to 6 inches; pale brown sandy loam & very gravelly sandy clay loam; weak fine granular structure; mildly alkaline
Subsoil	7 to 18 inches; pale brown very gravelly loam; moderate fine subangular blocky structure; mildly alkaline	—	6 to 13 inches; light yellowish brown very gravelly clay loam; moderate medium subangular blocky structure; mildly alkaline
Substratum	18 to 29 inches; pale brown very gravelly sandy loam; massive; moderately alkaline 29 inches; hard metasedimentary bedrock	3 to 12 inches; brownish yellow very cobbly clay loam; massive; moderately alkaline 12 inches; hard quartzitic sandstone bedrock	— 13 inches; hard noncalcareous sedimentary bedrock

Soil Properties

Restrictive Layer Depth	25 to 35 inches HB	12 to 14 inches HB	10 to 20 inches HB
Effective Rooting Depth (inches)	25 to 35 inches	12 to 14 inches	10 to 20 inches
Available Water Capacity	Very low to low (1.7 to 3.0 inches)	Very low (1.3 to 2.0 inches)	Very low to low (1.0 to 2.5 inches)
Water Retention Class	2 (1.5 to 1.8 inches)	2 (1.3 to 2.0 inches)	1 to 3 (1.0 to 2.5 inches)
Hydrologic Soil Group	C	D	D
Permeability (in./hr.)	0.6 to 2.0	0.2 to 0.6	0.2 to 0.6
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid	Medium	Rapid
Max Erosion Hazard	High to very high	Moderate	Moderate to High
Erosion Factor (k)			
Surface	0.15 (low)	0.15 (low)	0.15 (low)
Subsurface	0.10 (low)	0.15 (low)	0.10 (low)
T Value	2	1	1
Wind Erodability Group	8	8	3

122 - Finley - Moano - Mulett families complex (continued)

Soil Manageability Group Class	III 3Epx	III 2edpx	III 3Edgpx
Range Interpretations			
Productivity (lb/acre)	300 to 500	300 to 500	300 to 500
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; 40% shallow soils; 10% rock outcrop; high erosion hazard	Plant competition; 40% shallow soils; 10% rock outcrop; high erosion hazard	Plant competition; 40% shallow soils; 10% rock outcrop; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	5-8% slopes: Moderate - Percs slowly 8-15% slopes: Moderate - slope; percs slowly	Severe: Slope
Picnic Areas	Severe: Slope	5-8% slopes: slight 8-15% slope: Moderate - slope	Severe: Slope
Paths & Trails	15-25% slopes: Moderate - small stones 25-40% slopes: Severe - slope	Slight	Severe: Slope

Engineering Interpretations

Unified Class	SM-SC	CL	SM-SC
Surface	GM-GC	—	SC
Subsoil	SW-SM; SM-SC	SC	—
Substratum			
AASHTO Class			
Surface	A-2-4; A-4	A-4	A-2-4
Subsoil	A-1-b; A-2-4	—	A-2-6
Substratum	A-1-a; A-1-b; A-2-4	A-6	—
Suitability for			
Sand	Unsuited	Unsuited	Unsuited
Gravel	Unsuited	Unsuited	Unsuited
Topsoil	Poor: Slope; small stones	5-8% slopes: Poor - small stones; area reclaim 8-15% slopes: Poor - slope; small stones; area reclaim	Poor: Slope; small stones; area reclaim
Roadfill	15-25% slopes: Poor - area reclaim 25-40% slopes: Poor - slope; area reclaim	Poor: Area reclaim	Poor: Slope; Area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Checkett family, 30 to 40 percent slopes, on sideslopes of ridges; sedimentary rock outcrop, on ridges and mountainsides; the Washoe family, 15 to 30 percent slopes, on mid to lower mountainsides; and the Wrango family, 15 to 40 percent slopes, on mid to lower mountainsides. Included areas make up approximately 30 percent of the map unit area.

123 - Gol family - Durargidic Argixerolls complex, 2 to 15 percent slopes

Elevation: 8,400 to 10,300 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Gol family

35 percent

Sideslopes of low ridges of alluvial fans

4 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Morman Tea (*Ephedra* spp.)

Durargidic Argixerolls

30 percent

Alluvial fans

2 to 15 percent

Black Sagebrush (*Artemisia arbuscula nova*);
Cotton thorn (*Leptadymia axillaris*)

Soil Profile Description

Surface Layer

0 to 4 inches; brown gravelly loamy sand;
weak medium granular structure; neutral

0 to 4 inches; brown loamy sand; weak medium
granular structure; neutral

Subsoil

4 to 14 inches; yellowish brown gravelly &
very gravelly sandy loam; weak medium
subangular blocky structure; mildly alkaline

4 to 25 inches; brown, pale brown gravelly sandy
loam; weak & moderate medium subangular
blocky structure; neutral

Substratum

14 inches; weathered adamellite (paralithic
contact)

25-45 inches; pale brown, yellowish brown
gravelly sandy loam; massive; mildly alkaline

45 inches; highly weathered adamellite (paralithic
contact)

Soil Properties

Restrictive Layer Depth

9 to 14 inches PARA

45 to 60 inches PARA

Effective Rooting
Depth (inches)

9 to 14 inches

40 to 60 inches

Available Water
Capacity

Very low (0.6 to 1.1 inches)

Low to moderate (3.4 to 5.7 inches)

Water Retention Class

3 (0.6 to 1.1 inches)

2 (1.4 to 1.8 inches)

Hydrologic Soil Group

D

B

Permeability (in./hr.)

2.0 to 6.0

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Slow to medium

Slow to medium

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.05 (low)

0.15 (low)

Subsurface

0.10 (low)

0.20 (moderate)

T Value

1

3

Wind Erodability
Group

2

2

123 - Gol family - Durargidic Argixerolls complex (continued)

Soil Manageability
Group
Class

IV
4EPdx

IV
3Epx

Range Interpretations

Productivity (lb/acre)

500 to 700

300 to 700

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 35% shallow soils; high erosion hazard

Plant competition; 35% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

4-8% slopes:
Moderate - Too sandy; small stones
8-15% slopes:
Moderate - slope; too sandy; small stones

2-8% slopes:
Moderate - too sandy
8-15% slopes:
Moderate - slope; too sandy

Picnic Areas

4-8% slopes:
Moderate - Too sandy; small stones
8-15% slopes:
Moderate - slope; too sandy; small stones

2-8% slopes:
Moderate - too sandy
8-15% slopes:
Moderate - slope; too sandy

Paths & Trails

Moderate: Too sandy; small stones

Moderate: Too sandy

Engineering Interpretations

Unified Class

Surface

SM; SW-SM

SC

Subsoil

SW-SM; SM-SC

SM-SC

Substratum

—

SM

AASHTO Class

Surface

A-1-b; A-2-4

A-2-4

Subsoil

A-2-4

A-1-b; A-2-4

Substratum

—

A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Small stones; area reclaim

Poor: Small stones

Roadfill

Poor: Area reclaim

Fair: Area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Typic Haplargids soils, on alluvial fans; a soil similar to the Durargidic Argixerolls soils, but with finer textures, on old alluvial fans; a soil similar to the Typic Xerorthents soils, but less than 20 inches to soft bedrock, 4 to 15 percent slopes, on sideslopes of low ridges of alluvial fans; and granitic rock outcrop, throughout the map unit. Included areas make up approximately 35 percent of the map unit area.

124 - Hartig - Dunul families - Rock outcrop, granitic association, 50 to 70 percent slopes

Elevation: 5,800 to 10,400 feet Annual Precipitation: 9 inches

Soil Map Unit Components	Hartig family	Dunul family	Rock outcrop, granitic
Approx Proportion	35 percent	30 percent	15 percent
Landscape Position	Northerly & easterly-facing mountainsides	Southerly & westerly-facing mountainsides	Mountainsides & ridges
Slope	50 to 70 percent	50 to 70 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Common Pricklygillia (<i>Leptodactylon pungens</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline	1 to 0 inch; Litter 0 to 3 inches; pale brown very gravelly loamy sand; weak very fine granular structure; slightly acid	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—	—
Substratum	11 to 33 inches; brown extreme stony fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline 33 inches; hard fractured granitic bedrock	3 to 60 inches; pale brown & very pale brown very gravelly loamy sand, medium sand & gravelly medium sand; massive; neutral to moderately alkaline	—

Soil Properties

Restrictive Layer Depth	24 to 60 inches FB	Greater than 60 inches	—
Effective Rooting Depth (inches)	20 to 40 inches	40 to 60 inches	—
Available Water Capacity	Very low to moderate (1.5 to 4.8 inches)	Low (2.0 to 3.0 inches)	—
Water Retention Class	2 (1.5 to 2.0 inches)	3 (0.6 to 0.9 inches)	—
Hydrologic Soil Group	B	A	—
Permeability (in./hr.)	0.6 to 2.0	6.0 to 20.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Very Rapid	Very Rapid	—
Max Erosion Hazard	High	High-Very High	—
Erosion Factor (k)			
Surface	0.24 (moderate)	0.05 (low)	—
Subsurface	0.17 (low)	0.05 (low)	—
T Value	3	2	—
Wind Erodability Group	8	8	—

124 - Hartig - Dunul families - Rock outcrop (continued)

Soil Manageability Group Class	IV 4EGpx	IV 4EGPx	IV —
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Range Interpretations

Productivity (lb/acre)	300 to 400	300 to 500	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 15% rock outcrop; high erosion hazard; very steep slopes	Plant competition; 15% rock outcrop; high erosion hazard; very steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—

Engineering Interpretations

Unified Class Surface	SM	SW-SM	—
Subsoil	—	—	—
Substratum	GM	SW	—
AASHTO Class Surface	A-4	A-1-a; A-1-b; A-2-4	—
Subsoil	—	—	—
Substratum	A-1-a; A-1-b; A-2-4	A-1-a; A-1-b; A-2-4	—
Suitability for Sand	Unsuited	Good	—
Gravel	Poor: Slope; thin layer; excess fines	Unsuited	—
Topsoil	Poor: Slope; small stones	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	Poor: Slope	—

Included Areas & Remarks

Included in this map unit are small areas of the Packham family, on northerly and easterly-facing mountainsides; the Soakpak family, on upper mountainsides at higher elevations; a soil similar to the Soakpak family, but warmer, on upper mountainsides at higher elevations; and the Slinger family, on southerly and westerly-facing mountainsides. Included areas make up approximately 20 percent of the map unit area.

125 - Hartig family - Rock outcrop, granitic complex, 30 to 60 percent slopes

Elevation: 7,600 to 10,160 feet Annual Precipitation: 9 inches

Soil Map Unit Components	Hartig family	Rock outcrop, granitic
Approx Proportion	45 percent	30 percent
Landscape Position	Mountainsides	Ridgetop, sideslopes, & protrusions in floodplains
Slope	30 to 60 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Common Pricklygilia (<i>Leptodactylon pungens</i>)	—

Soil Profile Description

Surface Layer	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—
Substratum	11 to 33 inches; brown extremely stoney fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline	
	33 inches; hard fractured granitic bedrock	

Soil Properties

Restrictive Layer Depth	24 to 60 inches FB	—
Effective Rooting Depth (inches)	20 to 40 inches	—
Available Water Capacity	Very low to moderate (1.5 to 4.8 inches)	—
Water Retention Class	2 (1.5 to 2.0 inches)	—
Hydrologic Soil Group	B	—
Permeability (in./hr.)	0.6 to 2.0	—
Drainage Class	Well drained	—
Runoff	Rapid to very rapid	—
Max Erosion Hazard	Moderate to High	—
Erosion Factor (k)		
Surface	0.24 (moderate)	—
Subsurface	0.17 (low)	—
T Value	3	—
Wind Erodability Group	8	—

125 - Hartig family - Rock outcrop (continued)

Soil Manageability		
Group	III	—
Class	3Xegp	—

Range Interpretations

Productivity (lb/acre)	300 to 400	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 30% rock outcrop; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope	—

Engineering Interpretations

Unified Class		
Surface	SM	—
Subsoil	—	—
Substratum	GM	—
AASHTO Class		
Surface	A-4	—
Subsoil	—	—
Substratum	A-1-a; A-1-b; A-2-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Poor: Slope; thin layer; excess fines	—
Topsoil	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Wenzel family, 15 to 30 percent slopes, on benches of mountainsides; the Hartig family, 15 to 30 percent slopes, on mountainsides; and a soil similar to the St. Marys family, but warmer, and with a thick dark surface layer, 2 to 15 percent slopes, on floodplains. Included areas make up approximately 25 percent of the map unit area.

126 - Hartig - Packham families association, 30 to 60 percent slopes

Elevation: 8,300 to 11,500 feet Annual Precipitation: 9 to 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Hartig family

45 percent

Mid to lower mountainsides

30 to 60 percent

Big Sagebrush (*Artemisia tridentata*);
Pricklygilia (*Leptodactylon pungens*)

Packham family

40 percent

Upper mountainsides

50 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*); Arizona Wheatgrass (*Agropyron* spp.)

Soil Profile Description

Surface Layer

0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline

0 to 3 inches; pale brown extremely cobbly sandy loam; moderate very thick platy structure; neutral

Subsoil

—

3 to 15 inches; yellowish brown very gravelly & extremely gravelly sandy clay loam; massive; neutral

Substratum

11 to 33 inches; brown extremely stony fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline

15 to 60+ inches; light yellowish brown & very pale brown extremely gravelly & gravelly sandy loam; massive; none to violently effervescent; neutral to moderately alkaline

33 inches; hard fractured granitic bedrock

Soil Properties

Restrictive Layer Depth

24 to 60 inches FB

30 to 60 inches FB

Effective Rooting Depth (inches)

20 to 40 inches

20 to 50 inches

Available Water Capacity

Very low to moderate (1.5 to 4.8 inches)

Very low to low (1.3 to 3.3 inches)

Water Retention Class

2 (1.5 to 2.0 inches)

2 to 3 (1.0 to 1.2 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

0.6 to 2.0

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Rapid to very rapid

Very Rapid

Max Erosion Hazard

Moderate to High

Moderate to High

Erosion Factor (k)

Surface

0.24 (moderate)

0.05 (low)

Subsurface

0.17 (low)

0.05 (low)

T Value

3

3

Wind Erodability Group

8

8

126 - Hartig - Packham families association (continued)

Soil Manageability
Group
Class

III
2egp

III
3Peg

Range Interpretations

Productivity (lb/acre)

300 to 400

500 to 700

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard; steep slopes

Plant competition; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope; large stones

Engineering Interpretations

Unified Class

Surface

SM

GM; GW-GM

Subsoil

—

GM; GW-GM

Substratum

GM

GM; GW-GM

AASHTO Class

Surface

A-4

A-1-a; A-1-b; A-2-4

Subsoil

—

A-2-6

Substratum

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Poor: Slope; thin layer; excess fines

Poor: Excess fines

Topsoil

Poor: Slope; small stones

Poor: Slope; small stones

Roadfill

Poor: Slope; area reclaim

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Bondbranch family, but with carbonatic mineralogy, 60 to 80 percent slopes, on upper mountainsides; and a soil similar to the St. Marys family, but warmer, and with a thick dark surface layer, 2 to 15 percent slopes, on floodplains. Included areas make up approximately 15 percent of the map unit area.

127 - Hymas family - Rock outcrop, limestone association, 15 to 30 percent slopes

Elevation: 8,600 to 11,000 feet Annual Precipitation: 10 inches

Soil Map Unit Components	Hymas family	Rock outcrop, limestone
Approx Proportion	40 percent	30 percent
Landscape Position	Mountainsides, ridgetops	Convex slopes, ridgetops
Slope	15 to 30 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Juniper (<i>Juniperus</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 6 inches; brown gravelly sandy loam; weak fine granular structure; slightly to strongly effervescent; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—
Substratum	6 to 19 inches; yellowish brown very gravelly sandy loam; moderately fine subangular blocky structure; violently effervescent; moderately alkaline	—
	19 inches; hard fractured dolomite bedrock	—

Soil Properties

Restrictive Layer Depth	4 to 20 inches FB	—
Effective Rooting Depth (inches)	4 to 20 inches	—
Available Water Capacity	Very low (0.3 to 1.7 inches)	—
Water Retention Class	2 to 3 (0.3 to 1.7 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	2.0 to 6.0	—
Drainage Class	Well drained	—
Runoff	Rapid	—
Max Erosion Hazard	Moderate	—
Erosion Factor (k)		
Surface	0.10 (low)	—
Subsurface	0.10 (low)	—
T Value	1	—
Wind Erodability Group	8	—

127 - Hymas family - Rock outcrop (continued)

Soil Manageability Group	IV	IV
Class	4DEPX	—

Range Interpretations

Productivity (lb/acre)	400 to 600	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 40% shallow soils; 30% rock outcrop	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	15-25% slopes: Moderate - slope; small stones 25-30% slopes: Severe - slope	—

Engineering Interpretations

Unified Class		
Surface	SM-SC	—
Subsoil	—	—
Substratum	SW-SM; SM-SC	—
AASHTO Class		
Surface	A-1-b; A-2-4	—
Subsoil	—	—
Substratum	A-1-a; A-1-b; A-2-4	—
Suitability for		
Sand	Poor: Excess fines; thin layer	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	—
Roadfill	15-25% slopes: Poor - area reclaim 25-30% slopes: Poor - slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Hymas family, 30 to 60 percent slopes, on mountainsides; a soil similar to the St. Marys family, but with carbonatic mineralogy, 9 to 15 percent slopes, on lower mountainsides and toeslopes; a soil similar to the Beveridge family, but moister, 30 to 60 percent slopes, on steep southerly and westerly-facing mountainsides; and the Bartine family, 30 to 60 percent slopes, on steep mid to upper northerly and easterly-facing mountainsides. Included areas make up approximately 30 percent of the map unit area.

128 - Hymas family - Rock outcrop, limestone association, 30 to 60 percent slopes

Elevation: 6,400 to 10,900 feet Annual Precipitation: 10 inches

Soil Map Unit Components

	Hymas family	Rock outcrop, limestone
Approx Proportion	40 percent	35 percent
Landscape Position	Mountainsides	Convex slopes, ridgetops
Slope	30 to 60 percent	30 to 60 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Juniper (<i>Juniperus</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 6 inches; brown gravelly sandy loam; weak fine granular structure; slightly to strongly effervescent; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—
Substratum	6 to 19 inches; yellowish brown very gravelly sandy loam; moderately fine subangular blocky structure; violently effervescent; moderately alkaline	—
	19 inches; hard fractured dolomite bedrock	

Soil Properties

Restrictive Layer Depth	4 to 20 inches FB	—
Effective Rooting Depth (inches)	4 to 20 inches	—
Available Water Capacity	Very low (0.3 to 1.7 inches)	—
Water Retention Class	2 to 3 (0.3 to 1.7 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	2.0 to 6.0	—
Drainage Class	Well drained	—
Runoff	Rapid to very rapid	—
Max Erosion Hazard	Moderate to High	—
Erosion Factor (k)		
Surface	0.10 (low)	—
Subsurface	0.10 (low)	—
T Value	1	—
Wind Erodability Group	8	—

128 - Hymas family - Rock outcrop (continued)

Soil Manageability Group	IV	IV
Class	4DEPXg	—

Range Interpretations

Productivity (lb/acre)	400 to 600	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 40% shallow soils; 35% rock outcrop; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope	—

Engineering Interpretations

Unified Class		
Surface	SM-SC	—
Subsoil	—	—
Substratum	SW-SM; SM-SC	—
AASHTO Class		
Surface	A-1-b; A-2-4	—
Subsoil	—	—
Substratum	A-1-a; A-1-b; A-2-4	—
Suitability for		
Sand	Poor: Excess fines; thin layer	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the St. Marys family, but with carbonatic mineralogy, on mountainsides; the Hymas family, 15 to 30 percent slopes, on ridges; a soil similar to the Beveridge family, but moister, 60 to 80 percent slopes, on steep southerly and westerly-facing mountainsides; and the Bartine family, 60 to 80 percent slopes, on steep mid to upper northerly and easterly-facing mountainsides. Included areas make up approximately 25 percent of the map unit area.

129 - Lithic Camborthids - Rock outcrop, sedimentary association, 2 to 15 percent slopes

Elevation: 5,500 to 6,100 feet Annual Precipitation: 6 inches

Soil Map Unit Components	Lithic Camborthids	Rock outcrop, sedimentary
Approx Proportion	50 percent	20 percent
Landscape Position	Mid to lower mountainsides	Upper mountainsides & ridges
Slope	2 to 15 percent	—
Typical Vegetation	Shadscale (<i>Atriplex confertifolia</i>); Boxthorn (<i>Lycium</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 3 inches; grayish brown gravelly loam; weak fine granular structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	3 to 8 inches; pale brown very cobbly loam; moderate medium subangular blocky structure; moderately alkaline	—
Substratum	8 inches; hard fractured metasedimentary bedrock	—

Soil Properties

Restrictive Layer Depth	8 to 20 inches FB	—
Effective Rooting Depth (inches)	8 to 20 inches	—
Available Water Capacity	Very low to low (0.7 to 2.2 inches)	—
Water Retention Class	2 to 3 (0.7 to 2.2 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	0.6 to 2.0	—
Drainage Class	Well drained	—
Runoff	Slow to medium	—
Max Erosion Hazard	Moderate	—
Erosion Factor (k)		
Surface	0.24 (moderate)	—
Subsurface	0.15 (low)	—
T Value	1	—
Wind Erodability Group	4L	—

129 - Lithic Camborthids - Rock outcrop (continued)

Soil Manageability		
Group	IV	IV
Class	4PXde	—

Range Interpretations

Productivity (lb/acre)	100 to 300	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 30% shallow soils; 20% rock outcrop	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Depth to rock	—
Picnic Areas	Moderate: Small stones	—
Paths & Trails	Moderate: Small stones	—

Engineering Interpretations

Unified Class		
Surface	SC	—
Subsoil	SC	—
Substratum	—	—
AASHTO Class		
Surface	A-4	—
Subsoil	A-4	—
Substratum	—	—
Suitability for		
Sand	Unsuited	—
Gravel	Unsuited	—
Topsoil	Poor: Area reclaim; small stones	—
Roadfill	Poor: area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, on middle mountainsides; the Blackston family, on colluvial positions of high limestone concentrations; and Rubbleland-Scree, on mountainsides. Included areas make up approximately 30 percent of the map unit area.

130 - Lithic Camborthids - Rock outcrop, sedimentary association, 15 to 30 percent slopes

Elevation: 5,950 to 6,300 feet Annual Precipitation: 6 inches

Soil Map Unit Components	Lithic Camborthids	Rock outcrop, sedimentary
Approx Proportion	50 percent	25 percent
Landscape Position	Mid to lower mountainsides	Upper mountainsides & ridges
Slope	15 to 30 percent	—
Typical Vegetation	Shadscale (<i>Atriplex confertifolia</i>); Boxthorn (<i>Lycium</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 3 inches; grayish brown gravelly loam; weak fine granular structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	3 to 8 inches; pale brown very cobbly loam; moderate medium subangular blocky structure; moderately alkaline	—
Substratum	8 inches; hard fractured metasedimentary bedrock	—

Soil Properties

Restrictive Layer Depth	8 to 20 inches FB	—
Effective Rooting Depth (inches)	8 to 20 inches	—
Available Water Capacity	Very low to low (0.7 to 2.2 inches)	—
Water Retention Class	2 to 3 (0.7 to 2.2 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	0.6 to 2.0	—
Drainage Class	Well drained	—
Runoff	Rapid	—
Max Erosion Hazard	Moderate	—
Erosion Factor (k)		
Surface	0.24 (moderate)	—
Subsurface	0.15 (low)	—
T Value	1	—
Wind Erodability Group	4L	—

130 - Lithic Camborthids - Rock outcrop (continued)

Soil Manageability Group	IV	IV
Class	4PXde	—

Range Interpretations

Productivity (lb/acre)	100 to 300	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 50% shallow soils; 25% rock outcrop	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Depth to rock	—
Picnic Areas	Severe: Slope	—
Paths & Trails	15-25% slopes: Moderate - slope; small stones 25-30% slopes: Severe - slope	—

Engineering Interpretations

Unified Class		
Surface	SC	—
Subsoil	SC	—
Substratum	—	—
AASHTO Class		
Surface	A-4	—
Subsoil	A-4	—
Substratum	—	—
Suitability for		
Sand	Unsuited	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; area reclaim; small stones	—
Roadfill	15-25% slopes: Poor - area reclaim 25-30% slopes: Poor - slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, on mid-mountainsides; the Blackston family, on colluvial mountainsides having high limestone concentrations; and Rubbleland-Scree, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

131 - Lithic Camborthids - Rock outcrop, sedimentary association, 30 to 60 percent slopes

Elevation: 4,600 to 7,200 feet Annual Precipitation: 6 inches

Soil Map Unit Components	Lithic Camborthids	Rock outcrop, sedimentary
Approx Proportion	45 percent	30 percent
Landscape Position	Mid to lower mountainsides	Upper mountainsides & ridges
Slope	30 to 60 percent	—
Typical Vegetation	Shadscale (<i>Atriplex confertifolia</i>); Boxthorn (<i>Lycium</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 3 inches; grayish brown gravelly loam; weak fine granular structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	3 to 8 inches; pale brown very cobbly loam; moderate medium subangular blocky structure; moderately alkaline	—
Substratum	8 inches; hard fractured metasedimentary bedrock	—

Soil Properties

Restrictive Layer Depth	8 to 20 inches FB	—
Effective Rooting Depth (inches)	8 to 20 inches	—
Available Water Capacity	Very low to low (0.7 to 2.2 inches)	—
Water Retention Class	2 to 3 (0.7 to 2.2 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	0.6 to 2.0	—
Drainage Class	Well drained	—
Runoff	Rapid to Very Rapid	—
Max Erosion Hazard	Moderate to High	—
Erosion Factor (k)		
Surface	0.24 (moderate)	—
Subsurface	0.15 (low)	—
T Value	1	—
Wind Erodability Group	4L	—

131 - Lithic Camborthids - Rock outcrop (continued)

Soil Manageability Group	IV	IV
Class	4EPXdg	—

Range Interpretations

Productivity (lb/acre)	100 to 300	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 45% shallow soils; 30% rock outcrop; high erosion hazard; steep slope	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; Depth to rock	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope	—

Engineering Interpretations

Unified Class		
Surface	SC	—
Subsoil	SC	—
Substratum	—	—
AASHTO Class		
Surface	A-4	—
Subsoil	A-4	—
Substratum	—	—
Suitability for		
Sand	Unsuited	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; Area reclaim; small stones	—
Roadfill	Poor: Slope; Area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, on mid-mountainsides; the Blackston family, on colluvial mountainsides having high limestone concentrations; and Rubbleland-Scree, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

132 - Mackey - Unionville families complex, 3 to 15 percent slopes

Elevation: 5,750 to 8,450 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mackey family

45 percent

Upper alluvial fans

5 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Goldenbush (*Haplopappus* spp.)

Unionville family

30 percent

Lower alluvial fans; valley bottoms

3 to 15 percent

Juniper (*Juniperus* spp.); Big Sagebrush
(*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 3 inches; brown gravelly sandy loam;
weak fine granular structure; mildly alkaline

0 to 4 inches; brown gravelly sandy loam; weak
thin platy structure; moderately alkaline

Subsoil

3 to 42 inches; brown & yellowish brown
very gravelly sandy loam; weak medium
subangular blocky structure & massive; none
to slightly effervescent; mildly to moderately
alkaline.

4 to 26 inches; pale brown sandy loam; weak
medium subangular blocky structure; slightly
effervescent; moderately alkaline

Substratum

42 to 60 inches; light brownish gray
extremely gravelly loamy sand; massive;
strongly effervescent; moderately alkaline

26 to 60 inches; pale brown & light yellowish
brown gravelly sandy loam; massive; violently
effervescent; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

35 to 60+ inches HB

Effective Rooting
Depth (inches)

20 to 40 inches

20 to 40 inches

Available Water
Capacity

Low (2.7 to 3.6 inches)

Low to moderate (2.8 to 6.3 inches)

Water Retention Class

2 (1.2 to 1.6 inches)

2 (1.8 to 2.4 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

2.0 to 6.0

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Medium

Slow to medium

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.05 (low)

0.17 (low)

Subsurface

0.10 (low)

0.32 (moderate)

T Value

4

2

Wind Erodability
Group

3

3

132 - Mackey - Unionville families complex (continued)

Soil Manageability
Group
Class

III
3Ep

III
3Ep

Range Interpretations

Productivity (lb/acre)

300 to 400

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

3-8% slopes:
Slight
8-15% slopes:
Moderate - slope

Picnic Areas

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

3-8% slopes:
Slight
8-15% slopes:
Moderate - Slope

Paths & Trails

Moderate: Small stones

Slight

Engineering Interpretations

Unified Class

Surface

SM

SM

Subsoil

SW-SM; SM-SC

SM

Substratum

GW-GM

SM

AASHTO Class

Surface

A-1-b; A-2-4

A-1-b; A-2-4

Subsoil

A-1-a; A-1-b; A-2-4

A-2-4

Substratum

A-1-a; A-1-b; A-2-4

A-1-b; A-2-4

Suitability for

Sand

Unsuited

Poor: Excess fines

Gravel

Unsuited

Unsuited

Topsoil

Poor: Small stones

3-8% slopes:
Fair - small stones
8-15% slopes:
Fair - slope; small stones

Roadfill

Good

Good

Included Areas & Remarks

Included in this map unit are small areas of the Washoe family, on alluvial fans; the Bluewing family, in recent drainageways; and the Abgese family, 5 to 15 percent slopes, on upper alluvial fans. Included areas make up approximately 25 percent of the map unit area.

133 - Mackey - Washoe families complex, 3 to 15 percent slopes

Elevation: 5,400 to 7,200 feet Annual Precipitation: 9 to 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mackey family

55 percent

Old dissected alluvial fans

3 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Goldenbush (*Haplopappus* spp.)

Washoe family

25 percent

Stable old dissected alluvial fans

3 to 15 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 3 inches; brown gravelly sandy loam; weak fine granular structure; mildly alkaline

0 to 4 inches; light brownish gray very gravelly sandy loam; weak very thin platy structure; neutral

Subsoil

3 to 42 inches: brown & yellowish brown very gravelly sandy loam; weak medium subangular blocky structure & massive; none to slightly effervescent; mildly to moderately alkaline.

4 to 19 inches; light brown very gravelly clay loam & sandy clay loam; massive; neutral

Substratum

42 to 60 inches; light brownish gray extremely gravelly loamy sand; massive; moderately alkaline

19 to 60 inches; light yellowish brown extremely gravelly sandy loam & loamy sand; massive; strongly to violently effervescent; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

23 to 60+ inches FB

Effective Rooting Depth (inches)

20 to 40 inches

20 to 40 inches

Available Water Capacity

Low (2.7 to 3.6 inches)

Very low to low (0.7 to 2.5 inches)

Water Retention Class

2 (1.2 to 1.6 inches)

2 (1.3 to 1.6 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

2.0 to 6.0

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Slow to Medium

Slow to Medium

Max Erosion Hazard

High

Moderate

Erosion Factor (k)

Surface

0.05 (low)

0.05 (low)

Subsurface

0.10 (low)

0.15 (low)

T Value

4

3

Wind Erodability Group

3

8

133 - Mackey - Washoe families complex (continued)

Soil Manageability
Group
Class

III
3Ep

III
2ep

Range Interpretations

Productivity (lb/acre)

300 to 400

400 to 500

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

3-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

3-8% slopes:
Moderate - small stones; percs slowly
8-15% slopes:
Moderate - slope; small stones; percs slowly

Picnic Areas

3-8% slopes:
Moderate small stones
8-15% slopes:
Moderate - slope; small stones

Moderate: Small stones

Paths & Trails

Moderate: Small stones

Moderate: Small stones

Engineering Interpretations

Unified Class

Surface

SM

GM; GW-GM

Subsoil

SW-SM; SM-SC

SC

Substratum

GW-GM

GP

AASHTO Class

Surface

A-1-b; A-2-4

A-1-a, A-1-b; A-2-4

Subsoil

A-1-a; A-1-b; A-2-4

A-2-6

Substratum

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Small stones

Poor: Small stones

Roadfill

Good

Good

Included Areas & Remarks

Included in this map unit are small areas of the Wrango family, on old dissected alluvial fans; and a soil similar to the Checkett family, but shallow to soft bedrock, on old dissected alluvial fans. Included areas make up approximately 20 percent of the map unit area.

134 - Mascamp - Sumine families complex, 15 to 40 percent slopes

Elevation: 8,550 to 9,200 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Mascamp family

45 percent
Mountainsides
15 to 40 percent

Big Sagebrush (*Artemisia tridentata*);
Rabbitbrush (*Chrysothamnus* spp.)

Sumine family

30 percent
Mountainsides
15 to 40 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 7 inches; brown gravelly loam; moderate medium granular structure; neutral

2 to 0 inches; Litter

0 to 3 inches; dark grayish brown gravelly fine sandy loam; weak fine subangular blocky structure; neutral

Subsoil

7 to 14 inches; yellowish brown very gravelly clay loam; weak fine granular structure; neutral

3 to 52 inches; grayish brown, brown, light yellowish brown & light brown gravelly sandy clay loam, & gravelly, very gravelly, very stony & cobbly clay loams; moderate fine subangular blocky structure & massive; mildly to moderately alkaline

Substratum

14 inches; hard fractured metasedimentary bedrock

52 inches; hard fractured shale bedrock

Soil Properties

Restrictive Layer Depth

13 to 20 inches FB

25 to 60 inches FB

Effective Rooting Depth (inches)

13 to 20 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.3 to 2.5 inches)

Low to high (2.8 to 8.3 inches)

Water Retention Class

1 to 2 (1.3 to 2.5 inches)

1 to 2 (2.1 to 2.6 inches)

Hydrologic Soil Group

D

B

Permeability (in./hr.)

0.2 to 0.6

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate

Moderate to High

Erosion Factor (k)

Surface

0.17 (low)

0.15 (low)

Subsurface

0.10 (low)

0.10 (low)

T Value

1

2

Wind Erodability Group

3

3

134 - Mascamp - Sumine families complex (continued)

Soil Manageability
Group
Class

II	II
2edp	2e

Range Interpretations

Productivity (lb/acre)	600 to 1000	400 to 600
Suitability	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; 45% shallow soils	Plant competition; 45% shallow soils

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	Severe: Slope
Picnic Areas	Severe: Slope	Severe: Slope
Paths & Trails	15-25% slopes:	15-25% slopes:
	Moderate - small stones	Moderate - slope
	25-40% slopes:	25-40% slopes:
	Severe - slope	Severe - slope

Engineering Interpretations

Unified Class		
Surface	SC	SM
Subsoil	GM	GC
Substratum	—	—
AASHTO Class		
Surface	A-4	A-4
Subsoil	A-2-6	A-7-6
Substratum	—	—
Suitability for		
Sand	Unsuited	Unsuited
Gravel	Unsuited	Unsuited
Topsoil	Poor: Slope; small stones; area reclaim	Poor: Slope; small stones
Roadfill	15-25% slopes:	15-25% slopes:
	Poor - area reclaim	Fair - slope
	25-40% slopes:	25-40% slopes:
Poor - slope; area reclaim	Poor - slope	

Included Areas & Remarks

Included in this map unit are small areas of the Wenzel family, 5 to 15 percent slopes, in valley floors; the Trocken family, 2 to 5 percent slopes, on old dissected alluvial fans; and a soil similar to the Hymas family, but with mixed parent material, 30 to 40 percent slopes, on sideslopes of ridgetops. Included areas make up approximately 25 percent of the map unit area.

135 - Mascamp - Sumine families complex, 40 to 60 percent slopes

Elevation: 8,000 to 9,150 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Mascamp family	Sumine family
Approx Proportion	45 percent	30 percent
Landscape Position	Mountainsides	Mountainsides
Slope	40 to 60 percent	40 to 60 percent
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 7 inches; brown gravelly loam; moderate medium granular structure; neutral	2 to 0 inches; Litter 0 to 3 inches; dark grayish brown gravelly fine sandy loam; weak fine subangular blocky structure; neutral
Subsoil	7 to 14 inches; yellowish brown very gravelly clay loam; weak fine granular structure; neutral	3 to 52 inches; grayish brown, brown, light yellowish brown & light brown gravelly sandy clay loam & gravelly, very gravelly, very stony & cobbly clay loams; moderate fine subangular blocky structure & massive; mildly to moderately alkaline
Substratum	14 inches; hard fractured metasedimentary bedrock	52 inches; hard fractured shale bedrock

Soil Properties

Restrictive Layer Depth	13 to 20 inches FB	25 to 60 inches FB
Effective Rooting Depth (inches)	13 to 20 inches	20 to 40 inches
Available Water Capacity	Very low to low (1.3 to 2.5 inches)	Low to high (2.8 to 8.3 inches)
Water Retention Class	1 to 2 (1.3 to 2.5 inches)	1 to 2 (2.1 to 2.6 inches)
Hydrologic Soil Group	D	B
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6
Drainage Class	Well drained	Well drained
Runoff	Rapid to very rapid	Rapid to very rapid
Max Erosion Hazard	Moderate to High	High
Erosion Factor (k)		
Surface	0.17 (low)	0.15 (low)
Subsurface	0.10 (low)	0.10 (low)
T Value	1	2
Wind Erodability Group	3	3

135 - Mascamp - Sumine families complex (continued)

Soil Manageability
Group
Class

III
3Edgpx

III
3Egx

Range Interpretations

Productivity (lb/acre)

600 to 1000

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 45% shallow soils; 10%
rock outcrop; high erosion hazard; steep slopes

Plant competition; 45% shallow soils; 10% rock
outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: slope

Severe: slope

Picnic Areas

Severe: slope

Severe: slope

Paths & Trails

Severe: slope

Severe: slope

Engineering Interpretations

Unified Class

Surface

SC

SM

Subsoil

GM

GC

Substratum

—

—

AASHTO Class

Surface

A-4

A-4

Subsoil

A-2-6

A-7-6

Substratum

—

—

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Slope; small stones; area reclaim

Poor: Slope; small stones

Roadfill

Poor: Slope; area reclaim

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Hymas family, but with mixed parent material, 5 to 15 percent slopes, on ridgetops; a soil similar to the Simpson family, but cooler, 5 to 15 percent slopes, on benches of mountainsides; and Rock outcrop and slate, on ridges and mountainsides. Included areas make up approximately 25 percent of the map unit area.

136 - Mascamp - Sumine families - Rock outcrop, metasedimentary complex, 30 to 60 percent slopes

Elevation: 7,200 to 11,000 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Mascamp family	Sumine family	Rock outcrop, metasedimentary
Approx Proportion	35 percent	20 percent	15 percent
Landscape Position	Mountainsides	Mountainsides	Mountainsides & ridges
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 7 inches; brown gravelly loam; moderate medium granular structure; neutral	2 to 0 inches; Litter 0 to 3 inches; dark grayish brown gravelly fine sandy loam; weak fine subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	7 to 14 inches; yellowish brown very gravelly clay loam; weak fine granular structure; neutral	3 to 52 inches; grayish brown, brown, light yellowish brown & light brown gravelly sandy clay loam & gravelly, very gravelly, very stony & cobbly clay loams; moderate fine subangular blocky structure & massive; mildly to moderately alkaline.	—
Substratum	14 inches; hard fractured metasedimentary bedrock	52 inches; hard fractured shale bedrock	—

Soil Properties

Restrictive Layer Depth	13 to 20 inches FB	25 to 60 inches FB	—
Effective Rooting Depth (inches)	13 to 20 inches	20 to 40 inches	—
Available Water Capacity	Very low to low (1.3 to 2.5 inches)	Low to high (2.8 to 8.3 inches)	—
Water Retention Class	1 to 2 (1.3 to 2.5 inches)	1 to 2 (2.1 to 2.6 inches)	—
Hydrologic Soil Group	D	B	—
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to very rapid	Rapid to very rapid	—
Max Erosion Hazard	Moderate to High	High	—
Erosion Factor (k)			
Surface	0.17 (low)	0.15 (low)	—
Subsurface	0.10 (low)	0.10 (low)	—
T Value	1	2	—
Wind Erodability Group	3	3	—

136 - Mascamp - Sumine families - Rock outcrop (continued)

Soil Manageability Group Class	III 3Edgpx	III 3Egx	III —
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Range Interpretations

Productivity (lb/acre)	600 to 1000	400 to 600	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 35% shallow soils; 15% rock outcrop; high erosion hazard; steep slopes	Plant competition; 35% shallow soils; 15% rock outcrop; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—

Engineering Interpretations

Unified Class Surface	SC	SM	—
Subsoil	GM	GC	—
Substratum	—	—	—
AASHTO Class Surface	A-4	A-4	—
Subsoil	A-2-6	A-7-6	—
Substratum	—	—	—
Suitability for Sand	Unsuited	Unsuited	—
Gravel	Unsuited	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	Poor: Slope	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Hymas family, but with mixed parent material, on ridgetops; the Bearskin family, 15 to 30 percent slopes, on gentle sideslopes of ridges; the Toeja family, on upper mountainsides; the St. Marys family, on mountainsides; and the Wenzel family, 15 to 30 percent slopes, on mountainsides. Included areas make up approximately 30 percent of the map unit area.

Rock outcrop is slate.

137 - Merlin - Wenzel families - Rock outcrop, volcanic association, 5 to 60 percent slopes

Elevation: 7,350 to 11,360 feet Annual Precipitation: 11 inches

Soil Map Unit Components	Merlin family	Wenzel family	Rock outcrop, volcanic
Approx Proportion	40 percent	25 percent	20 percent
Landscape Position	Plateau tops	Mountainsides	Ridges & mountainsides
Slope	5 to 30 percent	30 to 60 percent	30 to 60 percent
Typical Vegetation	Low Sagebrush (<i>Artemisia arbuscula</i>); Squirreltail (<i>Sitanion</i> spp.)	Curleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 4 inches; brown gravelly & very gravelly sandy loam; weak fine granular & subangular blocky structure; slightly to medium acid	0 to 4 inches; grayish brown gravelly sandy loam; moderate fine & medium subangular blocky structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	4 to 15 inches: brown gravelly clay loam; moderate fine and medium subangular blocky structure; neutral	4 to 29 inches; brown, yellowish brown very gravelly clay loam and clay; moderately fine & medium subangular blocky structure & strong fine & medium angular blocky structure; mildly to moderately alkaline	—
Substratum	15 inches; basalt bedrock	29 inches; hard fractured siltstone bedrock	—

Soil Properties

Restrictive Layer Depth	10 to 20 inches HB	20 to 30 inches FB	—
Effective Rooting Depth (inches)	10 to 20 inches	10 to 20 inches	—
Available Water Capacity	Very low to low (1.3 to 3.2 inches)	Very low to low (1.7 to 3.1 inches)	—
Water Retention Class	1 to 2 (1.3 to 3.2 inches)	2 (1.7 to 2.1 inches)	—
Hydrologic Soil Group	D	C	—
Permeability (in./hr.)	0.2 to 0.6	0.06 to 0.20	—
Drainage Class	Well drained	Well drained	—
Runoff	Medium to Rapid	Rapid to very rapid	—
Max Erosion Hazard	Moderate	High	—
Erosion Factor (k)			
Surface	0.02 (low)	0.05 (low)	—
Subsurface	0.24 (moderate)	0.10 (low)	—
T Value	1	1	—
Wind Erodability Group	8	8	—
Soil Manageability			
Group	III	III	III
Class	3Xedp	4EXgp	—

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