SAVAGE & SAVAGE
FIELD DATA FORM: SOILS

DATA SHEET # 071605/UM1

LOCATION AND IDENTIFICATION

SITE NAME NRC EXPANSION

CITY NAME

COUNTY LA PLATA **STATE** CO

STUDY AREA SIZE _____ **ACRES**

WEATHER HOT, DRY

DRAINAGES

OBSERVER MSS/BAS

7.5' QUAD MORMON RESERVOIR

DATE 07 / 16 /2005

PHOTO FRAMES # 475-6

SAMPLE ID 071605/U1A

 # OF SAMPLES 1

GENERAL INFORMATION AND LANDSCAPE

SOIL SERIES or CLASS: UMBARG #69

PHYSIOGRAPHY: _____ **UNDERLYING MATERIALS:** _____

ELEVATION _____ **FT** **SLOPE** 2° **DEG** **ASPECT:** N / NE / E / SE / S / SW / W / NW

REGIONAL TERRAIN: FLAT / ROLLING / MOUNTAIN / CLIFFS/BLUFFS / ROCK OUTCROP / WETLAND

SOIL TYPE: NATIVE / DISTURBED **MOISTURE STATUS:** SATURATED WET MOIST DRY

DOMINANT PLANT COMMUNITY: SAGE/RABBIT BRUSH **PERCENT VEGETATION COVER:** 75%

PERCENT LITTER COVER: 10 **PERCENT BARE:** 10 **PERCENT ROCK:** Ø

EXISTING DISTURBANCE: NONE / LOW / MEDIUM / HIGH

GENERAL OBSERVATIONS:

DIAGRAM OF PEDON:

Oi	N/A	
Oe	N/A	0
Ah		38+
E	N/A	
EB	N/A	
BE	N/A	
B	N/A	
BC	N/A	
C		
R		

loam, dry, slightly friable, non-sticky

HORIZON	Oi	Oe	Ah	E	EB	BE	B	BC	C	R
DEPTH/ THICKNESS			0-38+"							
BOUNDARY DISTINCTNESS			not reached							
COLOR			10YR 4/2							
TEXTURE			loam							
STRUCTURE			loose slightly blocky							
CONSISTENCE			yes							
ROOTS			none							
PORES			none							
REACTION										
OTHER										

OTHER OBSERVATIONS

SAVAGE & SAVAGE
FIELD DATA FORM: SOILS

DATA SHEET # 071605/UMZ

LOCATION AND IDENTIFICATION

SITE NAME NPC Expansion

CITY NAME

COUNTY LaPlata **STATE** CO

STUDY AREA SIZE _____ **ACRES**

WEATHER Hot, dry

DRAINAGES

OBSERVER MSS/DAS

7.5' QUAD Marvan Reservoir

DATE 07 / 16 /2005

PHOTO FRAMES # 479

SAMPLE ID 071605/UMZ A

 # OF SAMPLES 1

GENERAL INFORMATION AND LANDSCAPE

SOIL SERIES or CLASS: Umbarg #69

PHYSIOGRAPHY: **UNDERLYING MATERIALS:**

ELEVATION _____ **FT** **SLOPE** 1 **DEG** **ASPECT:** N / NE / E / SE / S / SW / W / NW

REGIONAL TERRAIN: FLAT / ROLLING / MOUNTAIN / CLIFFS/BLUFFS / ROCK OUTCROP / WETLAND

SOIL TYPE: NATIVE / DISTURBED **MOISTURE STATUS:** SATURATED WET MOIST DRY

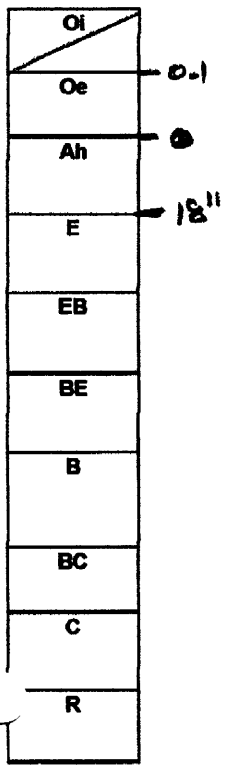
DOMINANT PLANT COMMUNITY: Sage/Rabbitbrush **PERCENT VEGETATION COVER:** 80

PERCENT LITTER COVER: 10 **PERCENT BARE:** 10 **PERCENT ROCK:** 0

EXISTING DISTURBANCE: NONE / LOW / MEDIUM / HIGH

GENERAL OBSERVATIONS:

DIAGRAM OF PEDON:



Veg litter

Loam, dry, slightly friable, non-sticky

HORIZON	Oi	Oe	Ah	E	EB	BE	B	BC	C	R
DEPTH/ THICKNESS		0.1	0-18"						> 18"	
BOUNDARY DISTINCTNESS			distinct						Sand lens	
COLOR			10YR 4/2							
TEXTURE			Loam							
STRUCTURE			loose sl. blocky							
CONSISTENCE			yes							
ROOTS			few							
PORES			none							
REACTION										
OTHER										

OTHER OBSERVATIONS

SAVAGE & SAVAGE
FIELD DATA FORM: SOILS

DATA SHEET # 071605/UM3

LOCATION AND IDENTIFICATION

SITE NAME NPC EXPANSION

CITY NAME _____

COUNTY La Plata **STATE** CO

STUDY AREA SIZE _____ **ACRES**

WEATHER Hot, Dry

DRAINAGES _____

OBSERVER KS/WAS

7.5' QUAD Mormon Reservoir

DATE 07 / 16 / 2005

PHOTO FRAMES # 479

SAMPLE ID 071605/UM3

 # OF SAMPLES 1

GENERAL INFORMATION AND LANDSCAPE

SOIL SERIES or CLASS: Umlong #69

PHYSIOGRAPHY: _____ **UNDERLYING MATERIALS:** _____

ELEVATION _____ **FT** **SLOPE** _____ **DEG** **ASPECT:** N / NE / E / SE / (S) / SW / W / NW

REGIONAL TERRAIN: (FLAT / ROLLING / MOUNTAIN / CLIFFS/BLUFFS / ROCK OUTCROP / WETLAND)

SOIL TYPE: (NATIVE / DISTURBED) **MOISTURE STATUS:** SATURATED WET MOIST (DRY)

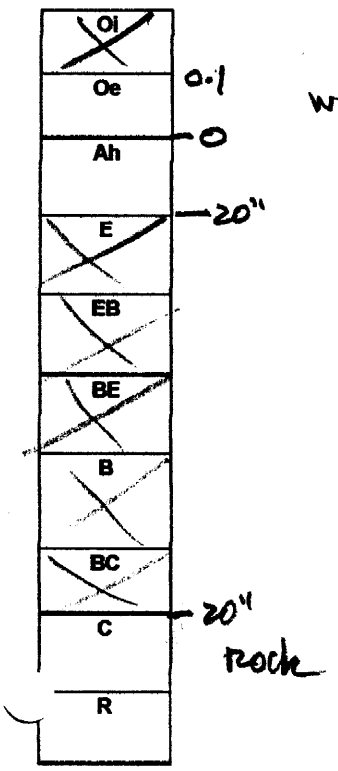
DOMINANT PLANT COMMUNITY: Weeds **PERCENT VEGETATION COVER:** 80

PERCENT LITTER COVER: 18 **PERCENT BARE:** 2 **PERCENT ROCK:** 0

EXISTING DISTURBANCE: NONE / (LOW) / MEDIUM / HIGH

GENERAL OBSERVATIONS: _____

DIAGRAM OF PEDON:



weed detritus

loam dry, loose, friable

2 colors 0-16 7.5YR 4/2
16-20 7.5YR 4/3

HORIZON	Oi	Oe	Ah	E	EB	BE	B	BC	C	R
DEPTH/ THICKNESS		0-1	0-20"						20"	
BOUNDARY DISTINCTNESS			distinct						distinct	
COLOR			7.5 YR 4/2 4/3							
TEXTURE			loam						rock	
STRUCTURE			loose							
CONSISTENCE			consistent							
ROOTS			no							
PORES			no							
REACTION										
OTHER										

OTHER OBSERVATIONS_____

SAVAGE & SAVAGE
FIELD DATA FORM: SOILS

DATA SHEET # 071605/LR01

LOCATION AND IDENTIFICATION

SITE NAME NRC Expansion

CITY NAME _____

COUNTY LaPlata **STATE** CO

STUDY AREA SIZE _____ **ACRES**

WEATHER Hot, dry

DRAINAGES _____

OBSERVER MSS/LRS

7.5' QUAD Mancos Reservoir

DATE 07/16/2005

PHOTO FRAMES # 477

SAMPLE ID 071605/LR01 A

 # OF SAMPLES 1

GENERAL INFORMATION AND LANDSCAPE

SOIL SERIES or CLASS: Lazear – Rock Outcrop Complex #42

PHYSIOGRAPHY: _____ **UNDERLYING MATERIALS:** Sandstone

ELEVATION _____ **FT** **SLOPE** 10 **DEG** **ASPECT:** N / NE / E / SE / S / SW / W / NW

REGIONAL TERRAIN: FLAT / ROLLING / MOUNTAIN / CLIFFS/BLUFFS / ROCK OUTCROP / WETLAND

SOIL TYPE: NATIVE / DISTURBED **MOISTURE STATUS:** SATURATED WET MOIST DRY

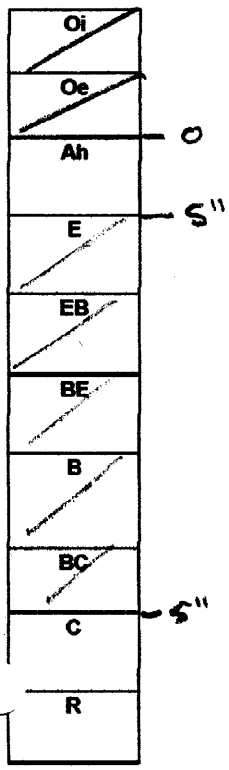
DOMINANT PLANT COMMUNITY: P-J **PERCENT VEGETATION COVER:** 70

PERCENT LITTER COVER: 10 **PERCENT BARE:** 10 **PERCENT ROCK:** 10

EXISTING DISTURBANCE: NONE / LOW / MEDIUM / HIGH

GENERAL OBSERVATIONS: _____

DIAGRAM OF PEDON:



stony loam, dry, friable

sandstone frags

HORIZON	Oi	Oe	Ah	E	EB	BE	B	BC	C	R
DEPTH/ THICKNESS		0.25"	0-5"							
BOUNDARY DISTINCTNESS		distinct	yes reach root							
COLOR		N/A	7.5YR 3/2							
TEXTURE		pine needles oak	loam							
STRUCTURE		loose	loose							
CONSISTENCE		spongy	yes							
ROOTS			none							
PORES			none							
REACTION										
OTHER										

OTHER OBSERVATIONS

SAVAGE & SAVAGE
FIELD DATA FORM: SOILS

DATA SHEET # 071605/LR02

LOCATION AND IDENTIFICATION

SITE NAME NKC EXPANSION

CITY NAME _____

COUNTY La Plata **STATE** CO

STUDY AREA SIZE _____ **ACRES**

WEATHER Hot Dry

DRAINAGES _____

OBSERVER MSS/JAS

7.5' QUAD Norman Reservoir

DATE 07 / 16 /2005

PHOTO FRAMES # 478

SAMPLE ID 071605/LR02 A, B

 # OF SAMPLES 2

GENERAL INFORMATION AND LANDSCAPE

SOIL SERIES or CLASS: Lazear - Rock Outcrop Complex # 42

PHYSIOGRAPHY: _____ **UNDERLYING MATERIALS:** Sandstone

ELEVATION _____ **FT** **SLOPE** 5 **DEG** **ASPECT:** N / NE / E / (SE / S) SW / W / NW

REGIONAL TERRAIN: FLAT / ROLLING / (MOUNTAIN / CLIFFS/BLUFFS) / ROCK OUTCROP / WETLAND

SOIL TYPE: (NATIVE) / DISTURBED **MOISTURE STATUS:** SATURATED WET MOIST (DRY)

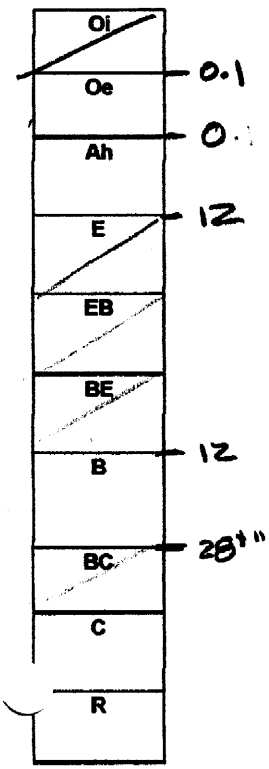
DOMINANT PLANT COMMUNITY: P-J **PERCENT VEGETATION COVER:** 70

PERCENT LITTER COVER: 10 **PERCENT BARE:** 10 **PERCENT ROCK:** 10

EXISTING DISTURBANCE: (NONE) / LOW / MEDIUM / HIGH

GENERAL OBSERVATIONS: _____

DIAGRAM OF PEDON:



scattered pinyon, juniper, oak needles, leaves twigs

two colors same texture clay loam dry

A
0-6" 10YR 4/2 no mottles
6-12" 10YR 4/2 10YR 5/8 mottles 20%

B
12-16" 10YR 3/1 no mottles
16-22" 10YR 5/2 10YR 6/8 5% mottle
22-28" 2.5Y 6/4

3 colors clay loam blocky subangular dry

HORIZON	Oi	Oe	Ah	E	EB	BE	B	BC	C	R
DEPTH/ THICKNESS			0-12				12-28+"			
BOUNDARY DISTINCTNESS		distinct	distinct				distinct			
COLOR			see Grant				see Grant			
TEXTURE										
STRUCTURE		pine juniper oak leaves twigs	dry blocky angular semi loose				dry blocky angular			
CONSISTENCE		sporadic	consistent							
ROOTS		n/a	none - few							
PORES		n/a	n/a							
REACTION										
OTHER										

OTHER OBSERVATIONS

SAVAGE & SAVAGE
FIELD DATA FORM: SOILS

DATA SHEET # 071605/AS1

LOCATION AND IDENTIFICATION

SITE NAME NKC Expansion

CITY NAME _____

COUNTY LaPlata **STATE** CO

STUDY AREA SIZE _____ **ACRES**

WEATHER Hot, dry

DRAINAGES _____

OBSERVER MSS/WAS

7.5' QUAD Marvin Reservoir

DATE 07/16 /2005

PHOTO FRAMES # 479

SAMPLE ID 071605/AS1

 # OF SAMPLES 1

GENERAL INFORMATION AND LANDSCAPE

SOIL SERIES or CLASS: _____

PHYSIOGRAPHY: _____ **UNDERLYING MATERIALS:** _____

ELEVATION _____ **FT** **SLOPE** _____ **DEG** **ASPECT:** N / NE / E / SE / S / SW / W / NW

REGIONAL TERRAIN: FLAT / ROLLING / MOUNTAIN / CLIFFS/BLUFFS / ROCK OUTCROP / WETLAND

SOIL TYPE: NATIVE / DISTURBED **MOISTURE STATUS:** SATURATED WET MOIST DRY

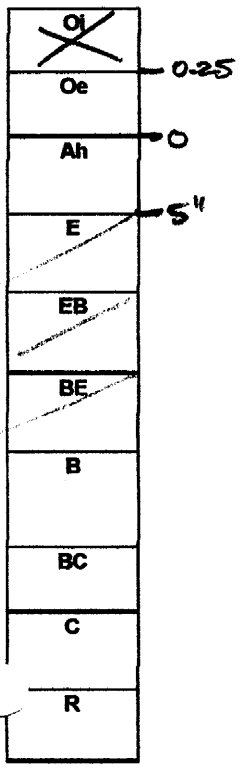
DOMINANT PLANT COMMUNITY: P-J **PERCENT VEGETATION COVER:** 75

PERCENT LITTER COVER: 15 **PERCENT BARE:** 5 **PERCENT ROCK:** 5

EXISTING DISTURBANCE: NONE / LOW / MEDIUM / HIGH

GENERAL OBSERVATIONS: _____

DIAGRAM OF PEDON:



Pinyon needles, twigs, oak leaves

sandy loam 10YR 4/2 loose w/ s/s frags

HORIZON	~~Oi~~	Oe	Ah	~~E~~	~~EB~~	~~BE~~	~~B~~	~~BC~~	C	R
DEPTH/ THICKNESS		0.25	0-5"						5"	
BOUNDARY DISTINCTNESS		distinct	distinct							
COLOR		/	10YR 4/2							
TEXTURE			sandy loam							
STRUCTURE			loose w/ rock frags						sandstone rocks	
CONSISTENCE			matrix w/ few rock frags							
ROOTS			few							
PORES			none							
REACTION										
OTHER										

OTHER OBSERVATIONS _____

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PHONE: 970-491-5061 / FAX: 970-491-2930

DATE RECEIVED: 07-22-2005
DATE REPORTED: 08-09-2005

BILLING:

RESEARCH SOIL ANALYSIS

071605

Lab #	Sample ID #	Paste pH	Paste EC mmhos/cm	% Saturation	Lime Estimate	% OM	AB-DTPA ppm NO_3-N	P	K	Zn	Fe	Mn	Cu
R82	AS 1	6.56	0.4	52.0	Low	3.5	2.5	8.7	247	2.5	28.4	11.5	2.9
R83	LRO1	7.1	0.3	58.3	Low	5.3	1.4	11.8	281	1.5	14.6	7.2	2.6
R84	LRO2A	7.59	0.5	52.2	Low	4.4	3.1	2.5	232	0.97	7.6	3.4	4.8
R85	LRO2B	7.62	0.4	47.2	High	3.0	2.3	0.6	134	1.1	4.5	1.3	5.0
R86	UM1	7.72	0.3	68.9	Low	3.5	1.9	3.1	150	0.74	6.9	2.6	2.5
R87	UM2	7.48	0.4	57.5	Low	2.0	4.2	6.2	269	1.1	10	2.7	1.9
R88	UM3	6.94	0.7	60.4	Low	3.1	3.8	62.4	667	4.3	79	8.4	3.3

Lab #	Sample ID #	AB-DTPA Extract ppm Al	Cd	Hg	Mo	Ni	Pb	Hot Water mg/kg B	Hot Water mg/kg Se	meq/100 g CEC
R82	AS 1	3.5	0.09	<0.05	<0.01	0.75	2.9	0.36	0.002	13.3
R83	LRO1	<0.01	0.06	<0.05	0.01	0.78	1.6	0.41	0.001	11.0
R84	LRO2A	2.0	0.06	<0.05	0.03	0.47	2.6	0.26	0.003	7.2
R85	LRO2B	1.8	0.06	<0.05	0.01	0.43	2.9	0.20	0.005	6.8
R86	UM1	1.5	0.03	<0.05	0.02	0.47	0.78	0.36	0.004	10.1
R87	UM2	5.6	0.04	<0.05	0.02	0.62	0.98	0.38	0.003	11.0
R88	UM3	4.9	0.06	<0.05	<0.01	0.72	1.1	1.08	0.002	6.0

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BILLING:

RESEARCH SOIL ANALYSIS

071605

Lab #	Sample ID #	meq/L Ca	Mg	Na	K	SAR	% Sand	Silt	Clay	Texture
R82	AS 1	2.9	1.3	1.0	0.4	0.7	54	25	21	Sandy Clay Loam
R83	LRO1	2.1	0.9	0.8	0.3	0.6	50	25	25	Sandy Clay Loam
R84	LRO2A	3.1	0.9	1.4	0.4	1.0	32	23	45	Clay
R85	LRO2B	2.3	0.9	1.6	<0.1	1.2	25	31	44	Clay
R86	UM1	2.4	1.1	0.7	0.2	0.6	56	26	18	Sandy Loam
R87	UM2	2.2	1.3	0.7	0.4	0.5	45	35	20	Loam
R88	UM3	4.6	2.2	1.0	1.9	0.5	46	34	20	Loam

Soil Horizon Suitability Criteria for Reclamation

Suspect Level

Parameter	Montana (1)	Wyoming (2)	Utah (3)	New Mexico (4)	Munshower (5)	CDMG (6)
pH	<5.5, >8.5	<5.0, >9.0	<4.5, >9.0	<5.5, >8.8		<5.5, >8.8
EC (mmhos/cm)	>4.0	>12.0	>15.0	>12.0		>8.0
SAR	>14.0 (sl, l)	>15.0 (coarse)	>15.0 (coarse)	>16.0 (cl, l)		>10
Saturation %						<25, >80
Molybdenum	>1.0	>1.0				
Boron	>5 ppm	>5 ppm	>5 ppm	>5 ppm		>5 ppm (pH>8.0)
Selenium	>0.1 ppm	>0.1 ppm	>0.1 ppm	>0.1 ppm		>2 ppm (pH>8.0)
Textural Class	>35% cl		gravel, v. coarse	>45% cl		cl, sicl, s,
Coarse fragments	>20%	>35%	>30% (3-10")	>35% (<3")		ls & s w/ >30% vfs
			>10% (>10")	>10% (>3")		
Aluminum					4-5 ppm	
Cadmium					0.1-1 ppm	
Copper					15-30 ppm	
Iron					2-5 ppm	
Lead					5-30 ppm	
Manganese					200-500 ppm	
Mercury					0.02-0.04 ppm	
Nickel					13-40 ppm	
Zinc					30-90 ppm	

Deficiency Level

Nitrogen (NO3)						
<1% organic matter						<12 ppm
1-2% organic matter						<6 ppm
>2% organic matter						no deficiency
Phosphorus						<3 ppm
Potassium						<60 ppm

(1) Montana Department of State Lands, 1983
(2) Wyoming Department of Environmental Quality, 1989
(3) Utah Division of Oil, Gas and Mining, 1988
(4) New Mexico Mining and Minerals Division, 1989
(5) Munshower, 1983
(6) CDMG unpublished guidance document

United States Department of Agriculture

NRCS

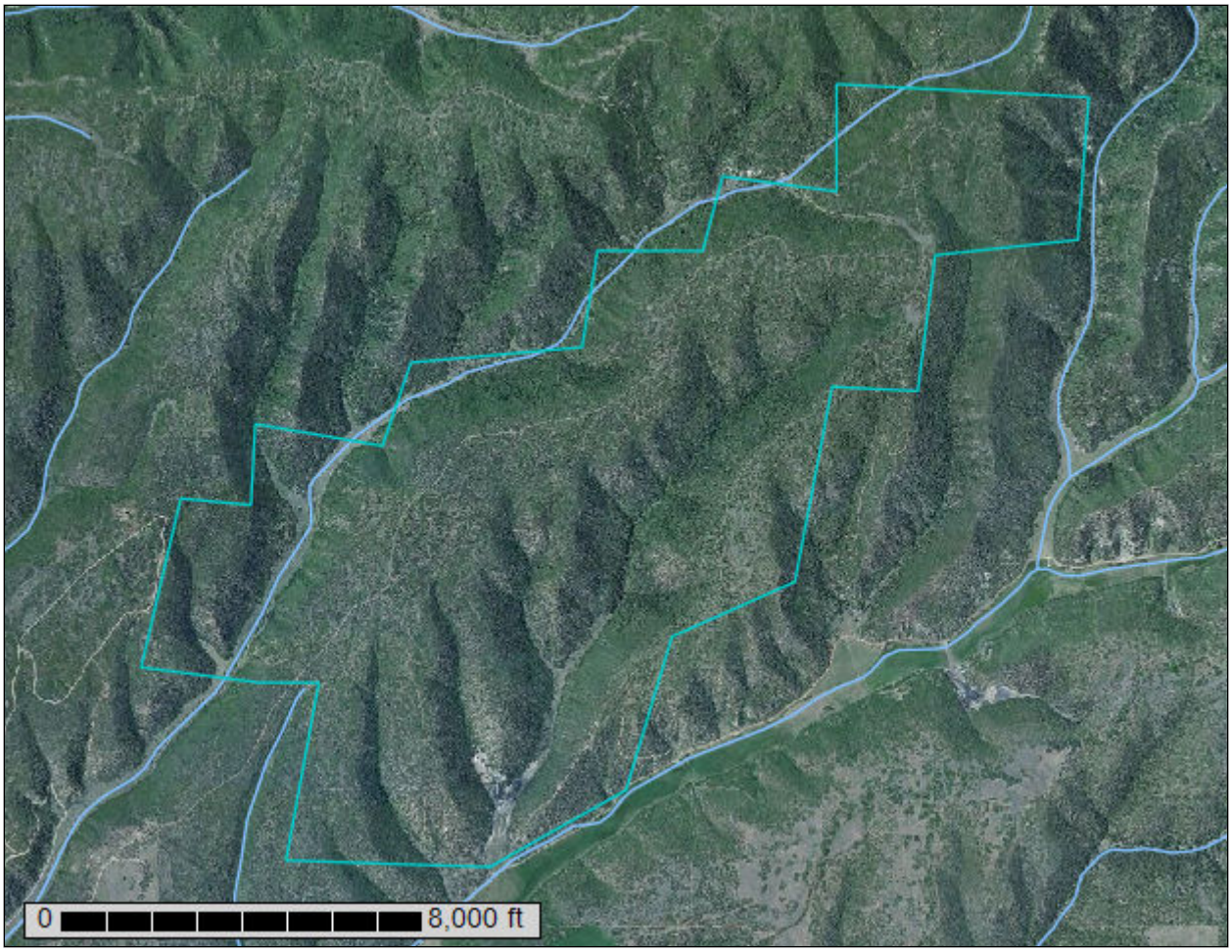
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

La Plata County Area, Colorado

GCC King II Mine



March 5, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

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

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

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

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

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

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

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

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

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

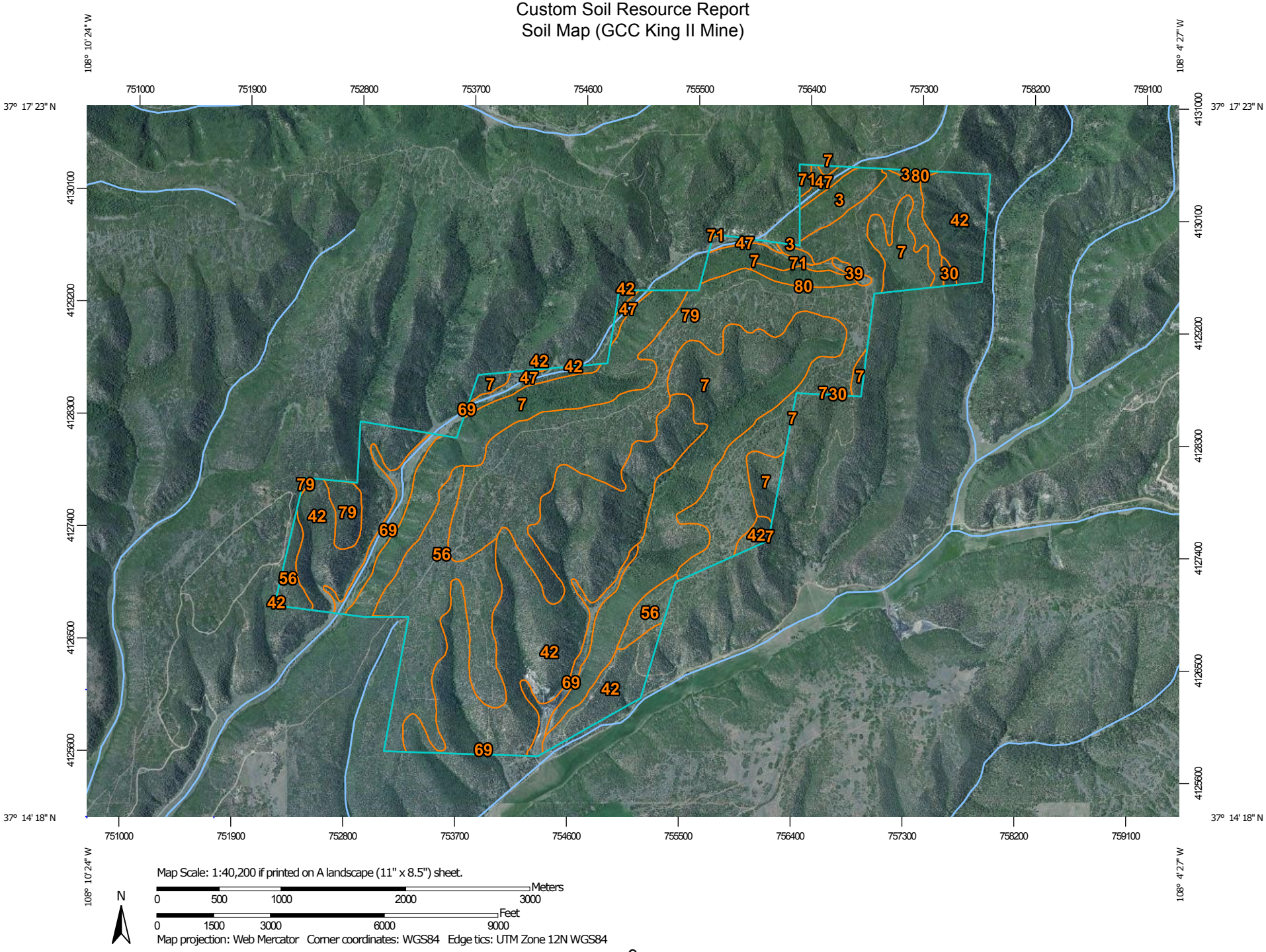
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (GCC King II Mine)



Map Scale: 1:40,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: La Plata County Area, Colorado
Survey Area Data: Version 14, Sep 23, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 3, 2010—Apr 24, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (GCC King II Mine)

La Plata County Area, Colorado (CO669)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
3	Weminuche like loam, 12 to 45 percent slopes	45.6	1.6%
7	Archuleta-Sanchez, stony, complex, 12 to 65 percent slopes	749.5	25.8%
30	Fortwingate-Rock outcrop complex, 6 to 25 percent slopes	4.8	0.2%
39	Hesperus loam, 3 to 12 percent slopes	5.9	0.2%
42	Lazear-Rock outcrop complex, 12 to 65 percent slopes	868.6	29.9%
47	Nutrioso loam	55.6	1.9%
56	Pulpit loam, 3 to 12 percent slopes	303.0	10.4%
69	Umbarg loam	87.0	3.0%
71	Valto-Rock outcrop complex, 12 to 65 percent slopes	11.2	0.4%
79	Zau stony loam, 3 to 9 percent slopes	751.2	25.8%
80	Zau stony loam, 9 to 25 percent slopes	25.4	0.9%
Totals for Area of Interest		**2,907.8**	**100.0%**

Map Unit Descriptions (GCC King II Mine)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called

noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

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

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

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can

be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

La Plata County Area, Colorado

3—Weminuche like loam, 12 to 45 percent slopes

Map Unit Setting

National map unit symbol: 2wr8c
Elevation: 8,500 to 10,000 feet
Mean annual precipitation: 24 to 34 inches
Mean annual air temperature: 30 to 40 degrees F
Frost-free period: 40 to 80 days
Farmland classification: Not prime farmland

Map Unit Composition

Weminuche like and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weminuche Like

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 4 inches: loam
E - 4 to 11 inches: loam
E/B - 11 to 21 inches: loam
Bt1 - 21 to 34 inches: clay loam
Bt2 - 34 to 44 inches: gravelly clay loam
BC - 44 to 62 inches: clay loam

Properties and qualities

Slope: 12 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.21 to 0.71 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Other vegetative classification: White fir - Rocky Mountain Douglas fir/mountain snowberry (ABCO-PSME/SYOR2) (C0114), Subalpine fir - Engelmann spruce/grouse whortleberry (ABLA-PIEN/VASC) (C0321)

Hydric soil rating: No

Minor Components

Nordicol like

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Aspen Woodland (F048AY449CO)
Other vegetative classification: QUAKING ASPEN (FCT217)
Hydric soil rating: No

Scotch

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Subalpine fir - Engelmann spruce/myrtle whortleberry (ABLA-PIEN/VAMY2) (C0320)
Hydric soil rating: No

7—Archuleta-Sanchez, stony, complex, 12 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2w4zd
Elevation: 7,300 to 8,500 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Archuleta and similar soils: 45 percent
Sanchez, stony, and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Archuleta

Setting

Landform: Dip slopes
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium over residuum weathered from sandstone and shale

Typical profile

A - 0 to 3 inches: loam
Bw - 3 to 16 inches: clay loam

Cr - 16 to 59 inches: bedrock

Properties and qualities

Slope: 12 to 65 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Other vegetative classification: Ponderosa pine/Gambel oak (PIPO/QUGA) (C1121)
Hydric soil rating: No

Description of Sanchez, Stony

Setting

Landform: Dip slopes
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium over residuum weathered from sandstone

Typical profile

E - 0 to 5 inches: very stony sandy clay loam
Bt - 5 to 11 inches: very stony clay loam
BC - 11 to 15 inches: stony sandy clay loam
R - 15 to 59 inches: bedrock

Properties and qualities

Slope: 12 to 45 percent
Percent of area covered with surface fragments: 0.1 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Other vegetative classification: Ponderosa pine/Gambel oak (PIPO/QUGA) (C1121)
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: Unranked

Hesperus

Percent of map unit: 10 percent
Landform: Dip slopes
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Brushy Loam (R048AY238CO)
Hydric soil rating: No

Sheek

Percent of map unit: 5 percent
Landform: Dip slopes
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

30—Fortwingate-Rock outcrop complex, 6 to 25 percent slopes

Map Unit Setting

National map unit symbol: 1ynb
Elevation: 7,600 to 8,800 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Fortwingate and similar soils: 45 percent
Rock outcrop: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fortwingate

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone and/or loess; slope alluvium derived from sandstone and/or loess

Typical profile

H1 - 0 to 7 inches: stony fine sandy loam

H2 - 7 to 12 inches: loam
H3 - 12 to 25 inches: sandy clay, clay loam, clay
H3 - 12 to 25 inches: clay, clay loam, stony sandy clay loam
H3 - 12 to 25 inches: unweathered bedrock
H4 - 25 to 32 inches:
H4 - 25 to 32 inches:
H4 - 25 to 32 inches:
H5 - 32 to 36 inches:

Properties and qualities

Slope: 6 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Goldvale

Percent of map unit: 15 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

39—Hesperus loam, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: 1ynm
Elevation: 7,000 to 8,500 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hesperus and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hesperus

Setting

Landform: Alluvial fans, valleys
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Medium-textured alluvium derived from mixed sources

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 45 inches: clay loam, loam, silty clay loam
H2 - 14 to 45 inches: loam, clay loam, sandy clay loam
H2 - 14 to 45 inches:
H3 - 45 to 60 inches:
H3 - 45 to 60 inches:
H3 - 45 to 60 inches:

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very high (about 27.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Loamy Park (R048AY222CO)
Hydric soil rating: No

Minor Components

Herm

Percent of map unit: 15 percent
Hydric soil rating: No

Alamosa

Percent of map unit: 5 percent
Landform: Alluvial fans
Hydric soil rating: Yes

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

42—Lazear-Rock outcrop complex, 12 to 65 percent slopes

Map Unit Setting

National map unit symbol: 1ynr
Elevation: 6,000 to 7,800 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 110 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Lazear and similar soils: 50 percent
Rock outcrop: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lazear

Setting

Landform: Breaks, mesas
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Residuum and/or slope alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 5 inches: very stony loam
H2 - 5 to 15 inches: stony loam, loam, clay loam

H2 - 5 to 15 inches: unweathered bedrock
H2 - 5 to 15 inches:
H3 - 15 to 19 inches:

Properties and qualities

Slope: 12 to 40 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (three-dimensional): Crest, base slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear

Minor Components

Pulpit

Percent of map unit: 10 percent
Hydric soil rating: No

Other soils

Percent of map unit: 10 percent
Hydric soil rating: No

47—Nutrioso loam

Map Unit Setting

National map unit symbol: 1ynx
Elevation: 7,000 to 8,000 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 43 to 46 degrees F

Frost-free period: 100 to 120 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nutrioso and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nutrioso

Setting

Landform: Alluvial fans, valleys
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Medium-textured alluvium derived from mixed sources

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 60 inches: stratified fine sandy loam to clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: Loamy Park (R048AY222CO)
Hydric soil rating: No

Minor Components

Hesperus

Percent of map unit: 15 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

56—Pulpit loam, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2wqxq
Elevation: 6,120 to 8,060 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 105 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Pulpit and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pulpit

Setting

Landform: Dip slopes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits over residuum weathered from sandstone

Typical profile

A - 0 to 3 inches: loam
Bt - 3 to 10 inches: silt loam
Bk - 10 to 24 inches: silt loam
2R - 24 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Loamy Mesa Top - (Pinyon-Juniper) (R036XY142CO)
Hydric soil rating: No

Minor Components

Wetherill

Percent of map unit: 10 percent
Landform: Dip slopes
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Foothills (R036XY284CO)
Hydric soil rating: No

Gladel

Percent of map unit: 10 percent
Landform: Dip slopes
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy Mesa Top - (Pinyon-Juniper) (R036XY141CO)
Hydric soil rating: No

69—Umbarg loam

Map Unit Setting

National map unit symbol: 1ypp
Elevation: 6,000 to 7,200 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 120 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Umbarg and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Umbarg

Setting

Landform: Alluvial fans, valleys
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Moderately fine-textured alluvium

Typical profile

H1 - 0 to 29 inches: loam
H2 - 29 to 60 inches: clay loam, loam
H2 - 29 to 60 inches:

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 16.6 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Deep Loam (R048AY292CO)
Hydric soil rating: No

Minor Components

Shalona
Percent of map unit: 9 percent
Hydric soil rating: No

Other soils
Percent of map unit: 5 percent
Hydric soil rating: No

Aquents
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

71—Valto-Rock outcrop complex, 12 to 65 percent slopes

Map Unit Setting
National map unit symbol: 1yps
Elevation: 7,500 to 9,000 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition
Valto and similar soils: 45 percent
Rock outcrop: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valto

Setting

Landform: Breaks, ridges, mountain slopes
Landform position (three-dimensional): Mountaintop, mountainflank, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Slope alluvium and/or residuum weathered from sandstone

Typical profile

H1 - 0 to 2 inches: very stony fine sandy loam
H2 - 2 to 12 inches: very stony sandy loam, very stony fine sandy loam, extremely stony sandy loam
H2 - 2 to 12 inches: unweathered bedrock
H2 - 2 to 12 inches:
H3 - 12 to 16 inches:

Properties and qualities

Slope: 12 to 50 percent
Percent of area covered with surface fragments: 1.0 percent
Depth to restrictive feature: 6 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Breaks, ridges, mountain slopes
Landform position (three-dimensional): Mountaintop, mountainflank, side slope, crest
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 65 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Fortwingate

Percent of map unit: 15 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

79—Zau stony loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1yq1
Elevation: 7,600 to 8,000 feet
Mean annual precipitation: 20 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 75 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Zau and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zau

Setting

Landform: Mesas, mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 8 inches: stony loam
H2 - 8 to 27 inches: clay loam, clay
H2 - 8 to 27 inches: clay loam, sandy clay loam
H3 - 27 to 32 inches: weathered bedrock
H3 - 27 to 32 inches:
H4 - 32 to 36 inches:

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Moderate (about 8.6 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: Brushy Loam (R048AY238CO)
Hydric soil rating: No

Minor Components

Herm
Percent of map unit: 10 percent
Hydric soil rating: No

Coni
Percent of map unit: 5 percent
Hydric soil rating: No

Fortwingate
Percent of map unit: 5 percent
Hydric soil rating: No

80—Zau stony loam, 9 to 25 percent slopes

Map Unit Setting
National map unit symbol: 1yq3
Elevation: 7,600 to 8,000 feet
Mean annual precipitation: 20 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 75 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition
Zau and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zau

Setting
Landform: Mesas, mountain slopes
Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 8 inches: stony loam
H2 - 8 to 27 inches: clay loam, clay
H2 - 8 to 27 inches: clay loam, sandy clay loam
H3 - 27 to 32 inches: weathered bedrock
H3 - 27 to 32 inches:
H4 - 32 to 36 inches:

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Brushy Loam (R048AY238CO)
Hydric soil rating: No

Minor Components

Coni

Percent of map unit: 10 percent
Hydric soil rating: No

Herm

Percent of map unit: 10 percent
Hydric soil rating: No

Fortwingate

Percent of map unit: 5 percent
Hydric soil rating: No

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